THE

VETERINARY JOURNAL

MARCH, 1907.

MR. WILLIAM HUNTING, F.R.C.V.S.

No man has devoted himself more ungrudgingly and unselfishly to all phases of the field of veterinary work than the gentleman whose portrait appears on the front page of this month's Journal; and we are also safe to say, without fear of contradiction, that Mr. Hunting is one of the most popular and universally respected leaders of our profession.

Born in 1846, the son of Mr. Charles Hunting, M.R.C.V.S., of South Hetton, in Durham, Mr. William Hunting commenced his professional studies under the late Professor Gamgee, at the New Veterinary College, Edinburgh, and gained his diploma in 1865, being then only nineteen years of age.

Immediately after qualifying he was appointed Professor of Veterinary Science in the Royal Agricultural College at Cirencester, a position which he resigned in order to become Professor of Anatomy in the Albert Veterinary College in London. The year 1868 found the Albert College non-existent, and Mr. Hunting then settled down to the arduous task of building up a practice in the West End of London, taking up his quarters in Mayfair, and finding before him years of uphill work. It is not, however, as a London practitioner that we know Mr. Hunting best, but as a consultant whose opinion is always worthy of deep consideration, and as an expert on lameness, on diseases of the foot, and glanders. His knowledge of the latter, and the great experience he has had as Veterinary Inspector for so very many years to the London County Council, obtained official recognition in January last, when he was appointed on the permanent staff as Chief Veterinary Inspector—a position which necessitated that he should give up all outside work and devote himself entirely to the stamping out of this equine scourge. Without committing ourselves to anything rash, we venture to say that if only the Council will give

Mr. Hunting a free hand, and the Treasury will advance the necessary funds, glanders in England will, in five years' time, be a disease unknown either in horse or man.

Mr. Hunting's contributions to veterinary literature are far too many to specify individually, the first appearing in the *Edinburgh Veterinary Review* in 1864. Of books, as far back as 1887 he published a brochure on Glanders, and his work on Horse-shoeing has been so appreciated by both master and working farrier that it has passed through three editions.

Probably, however, the literary effort with which he has been associated in our minds has been the establishment of the *Veterinary Record*. The founding of a professional paper necessitates the expenditure of more time and energy, to say nothing of the monetary aspect, than men who have never attempted it can possibly understand; and if for no other reason than this the veterinary profession owe William Hunting a debt of gratitude.

Of his willingness to assist veterinary societies and their appreciation thereof we have ample evidence in the fact that most of them have him on their lists as an Honorary Member; and the Council of the Royal College of Veterinary Surgeons (of which Mr. Hunting was for many years a Member) have conferred upon him the highest honours it could possibly bestow in electing him as President, in conferring upon him the Steel Memorial Medal, and in electing him as one of the Board of Examiners both for the membership examinations and for the Fellowship.

Mr. Hunting's services as Secretary to the National Veterinary Association are too well known to need comment; and his other honours include the Fellowship of the Sanitary Institute, the position of Member of Council of the Lister Institute, External Examiner in Veterinary Science to the University of London, Examiner in Veterinary Science to the Royal Agricultural College, Cirencester, and Chief Veterinary Official to the Metropolitan Asylums Board.

Editorials.

MEAT INSPECTORS AND THEIR QUALIFICATIONS.

UNDOUBTEDLY of late the veterinary profession has been able to prove, to the satisfaction of many laymen and Corporations, the fact that its members are pre-eminently fitted by virtue of their training to carry out satisfactorily the duties involved in the inspection of meat for human consumption, of cattle to be slaughtered for that purpose, and of dairies where so important an article of diet as milk is produced. It seems to us, however, that other bodies, such as the Royal Sanitary Institute and the Royal Institute of Public Health, are marching in the same direction, and, judging by recent advertisements, these bodies have been able to produce the impression that their certificates are of much greater value than is in reality the case. We do not wish for one moment to detract from the real value of these certificates, which go to indicate that their possessors have passed examinations requiring a certain amount of knowledge of Sanitary matters and Elementary Meat Inspection. The holders of such certificates must consequently be regarded as, and undoubtedly are, better fitted for the posts of Sanitary Inspectors and lay assistants to the professional meat-inspectors than retired 'bus conductors, bricklayers, and others, who up to the present have held such positions and have had no training in such matters. But what are we to think when members of the Royal College of Veterinary Surgeons are asked to produce such certificates? The present course of instruction on practical and theroetical meat inspection demanded by the Royal College of Veterinary Surgeons, and the standard required to pass the examination in that subject, are higher and more extended than those necessary to obtain the afore-mentioned certificates. Consequently we definitely assert that the possessor of the diploma of the Royal College of Veterinary Surgeons has, *ipso facto*, a higher qualification for Meat Inspection than the holder of certificates of one or more of the Sanitary bodies. That being the case, why should the possessor of a higher qualification be asked to produce evidence of a lesser qualification? We consider it an insult to be asked to do so, and further, we consider it decidedly *infra dig* for a professional man who has passed through the course at a Veterinary School and obtained the higher qualification, to submit himself to an examination for the lesser.

If we admit that the possession of such certificates by veterinary surgeons indicates special qualifications, we thereby admit that the course prescribed by the Royal College of Veterinary Surgeons, and the possession of the Diploma of Membership, to be insufficient. We unhesitatingly deny any such suggestion, and maintain that the training now given in all the British Veterinary Colleges in Meat Inspection renders their graduates more competent to properly execute the duties appertaining thereto than the training given anywhere else in the British Isles, and particularly is this the case of men who have obtained the higher Fellowship Degree, to be successful for which it is imperative that they shall have again submitted themselves to a further Examination in Pathology, Hygiene, and Sanitary Science.

We believe, however, that the slight thus offered to our profession by Corporations who advertise for professional meat inspectors is by no means intentional, but due to lack of knowledge of the requirements of the Examining body of the College in this subject. Our Diploma does not bear on its face any evidence of such a training, and until recent years the veterinary surgeon has certainly not been associated in the lay mind with any special ability or qualification as an Inspector of Meat. We consider that the Royal College of Veterinary Surgeons ought to specially indicate the words "Meat Inspection" on the present Diploma, or else grant an additional certificate to students who pass their final professional examination, as this includes the subject of Meat Inspection. By this means the public would become better acquainted with the Veterinary Surgeon's qualifications in this branch of his profession, and the Veterinary Surgeon would be able to produce the paper which appears to be so much sought after by Corporations, showing on the face of it that he has had special training in Meat Inspection. If a precedent for such a procedure is necessary one might quote that the examining bodies for medical qualifications already grant Certificates of Public Health in addition to their Diplomas or Degrees. We believe that some such step as the one we advocate was suggested some years ago in the columns of the *Veterinarian*, but the time was not then ripe. Veterinary educational affairs have undergone a marked change since then, and it is high time that steps were taken by the Royal College in order to preserve and establish the rights of prestige of its Members in this important direction.

THE VALUE OF PRACTICAL DEMONSTRATIONS BEFORE VETERINARY ASSOCIATIONS AS A MEANS OF DIFFUSING KNOWLEDGE.

To read in a text book of the method of performing an operation is one way of acquiring the necessary knowledge to enable that operation to be performed, but, at all events to most of us, to actually see the operation done is undoubtedly better; and it is to the question of more "practical demonstrations" that the attention of the Presidents and Secretaries of our various Veterinary Medical Societies should be drawn, in order that good, full meetings may be assured, and the diffusion of useful knowledge be utilised to the fullest extent. It may reasonably be argued that all subjects cannot be treated in this way, and with this we are agreed, but it is also an undeniable fact that very much more might be done than has been done in the past, and it is astonishing how very much more interest is always displayed in a lecture or essay which is illustrated by a practical demonstration, lantern slide illustrations, or the production of illustrative actual specimens. American veterinarians have thoroughly awakened to this fact, and the meetings of many of the Veterinary Medical Societies are now regularly preceded by one or more Surgical Demonstrations, certain experts being asked to operate, and suitable subjects being provided. The American Veterinary Medical Association, the counterpart of the National Veterinary Association of England, is particularly to the fore in this respect, and although for many years certain Essayists in Great Britain have always, when asked to address Members of Associations, selected subjects which could be practically illustrated, much more could be done in this direction. There are still many members of our profession, both in Great Britain and America, who, although they may be able to talk glibly about antiseptics, anæsthesia, and oil immersion lenses, would, if practically put to the test, instantly show their dense ignorance of either. A demonstration on the practical recognition of such an every-day bacillus as that of anthrax and its simplest methods of staining, together with the pitfalls to be avoided in making a diagnosis, would command an audience sufficient to gladden the heart of even the most ambitious President of any of our Veterinary Associations; and demonstrations of all operations—even the practical use of some new cautery or other instrument—are all methods of spreading knowledge and of furthering the great work veterinarians do for the community.

Even a practical demonstration of the value and uses, with

modern methods of administration, of present-day anæsthetics would enlighten many of us, and we, as a body, ought to be in the forefront of all methods of alleviating pain to our patients of the animal world. That we are not always so is an unfortunate fact, as there are still plenty of Veterinary Surgeons who have never once even used chloroform, and would actually advise that it is not necessary.

Generally, it is true, such advice is given on account of a deplorable ignorance of up-to-date methods, and from a knowledge which is limited to the fact that all anæsthetics have toxic properties, but the method of administration which is reasonably safe is one which requires actual demonstration. The man in busy practice has no time for a complete Post-Graduate Course, and the only way open to him for acquiring the increase of knowledge he is always thirsting after, lies in an exchange of ideas with his fellow men, either by means of the various professional journals or by becoming a member of the Veterinary Society of his district and attending its meetings.

The latter, of course, is an essential factor, but just as the duty of collecting the scattered flock together devolves upon the shepherd and his faithful co-worker, so do the members of an Association expect the officials whom they honour to take a personal pride in being able to provide subjects of sufficient weight to attract the intellectual curiosity of even the most apathetic of their colleagues.

The position of a leading official to a large Society, although an honour, is rather a thankless one if the members are unresponsive, and that the picture is not overdrawn is seen almost every week by the paucity of regular attendances made at many of our professional gatherings.

Original Articles.

THE NECESSITY FOR THE VETERINARY INSPECTION OF DAIRY CATTLE.

BY ARTHUR PAYNE, F.R.C.V.S., VETERINARY INSPECTOR TO THE DISTRICT COUNCILS OF WEYBRIDGE, WALTON, AND MOLESEY.

The principal diseases a Veterinary Officer of Health has to deal with in inspecting dairy cattle are: (1) leucorrhœa; (2) ringworm and various other skin affections; (3) various types of mastitis; (4) abscesses in the udder; (5) ulcers on udder and teats; (6) certain changes which take place in the milk without any appreciable alteration in the gland itself; (7) diarrhœa, which is a common ailment; (8) tuberculosis. And among the more common diseases said to be

communicable to man through the medium of milk are: (1) scarlet fever; (2) diphtheria; (3) various throat affections; (4) diarrhœa; especially the infantile summer variety; (5) certain stomach and bowel disorders; (6) tuberculosis.

Upon examining the cows at a dairy farm not under the jurisdiction of a veterinary surgeon, 8 to 10 per cent. will be found to have some affection of the mammary glands, which renders the milk totally unfit for human consumption. At any rate, this was my experience, and the state of affairs on my first visits to the various herds of dairy cattle, and mine is a fairly representative district. (The cows in London have been examined since 1897; in that year the diseased udders averaged 13·2 per cent., which in June, 1903, had fallen to 4·8 per cent.)—"Report of the Medical Officer of Health, London."

Many of the dairy farms in the country are carried on under filthy conditions, especially during the winter months, when cows are kept in day and night. The manure is allowed to collect on the hind quarters and udders, till towards the end of the winter there are enormous clumps of fæcal matter, which by degrees are thrown off as the cow sheds her coat.

A fairly common sight in walking through a cowshed, with the occupants ready for milking, is a newly-calved cow with uterine discharges on her tail, hind quarters, and even on the udder. The idea of washing this off never enters the head of the cowman, but there it will stay for days, till it wears off, in the meantime forming a resting place and medium for the growth of pathogenic bacteria lurking about in the immediate vicinity.

I have seen the teats so sore and covered with filth that the milker has to use his finger-nails in order to remove a scab which has sealed up the orifice of the teat canal.

The necessity for keeping cows clean is emphasised by Park, of New York, in experiments carried out by him (*Journal of Hygiene*, 1901, p. 393). He collected milk from cows under the following conditions:—

(1) Cows placed in clean barns before milking, the long hair being clipped from the udders, the udders being wiped, and the hands of the milkers washed. Pails sterilised by steam. The milk was cooled to 45° F. within one hour of milking, and kept at that temperature. The number of bacilli in 1 cc. of milk five hours after milking was 500.

(2) Under conditions in which the barns were fairly clean, but dusty, the visible dirt being cleaned off hair of udders. The milkers' hands were wiped only and the milk cooled two hours after milking. There were 15,500 bacilli in 1 cc. of milk at time of milking.

(3) He examined milk from places where the ground was covered with manure and the cows visibly dirty. The milkers' hands were not cleaned at all. The pails were cleansed and the milk cooled. In this sample there were 30,366 in 1 cc. of milk shortly after milking.

Backhaus, of Königsberg, found that milk from a clean cow contained 20,600 bacilli in 1 cc.; and from a dirty cow he found 170,000 per cc.; and he also found that milk from a washed udder contained half the quantity of organisms as that from an unwashed one.

Another proof of the good effects which follow cleanliness of dairy cattle and veterinary inspectorship is demonstrated by Stokes and Wegefarth, who examined the milk of 100 cows for pus cells.

In the first lot the stalls were well ventilated, cows groomed and cleaned, and they were also under veterinary supervision: 1·1 pus cells were found to the field of microscope.

In the second lot they also examined the milk from fifty cows with badly ventilated stables not cleaned or inspected: 11·3 pus cells were found to the field of microscope.

In another lot of 100 cows with no ventilation or light, stabled in narrow stalls and kept in for months together, an average number of 19·2 pus cells was found. Streptococci and other organisms were present in large numbers.*

The presence of pus cells in milk is very significant, as it points to some irritating germs in the udder, causing the migration of leucocytes. Through the insanitary condition of the cow and her surroundings various organisms gain access to the teat canal and milk. According to many observers the teat canal forms a regular promenade for bacteria. Guillibeau, out of sixteen cows, found the canal to be occupied by organisms in nine; Zschokke found six out of ten.

According to Leblanc, the microbes usually found in this position are staphylococci. These organisms, as we know, are associated with suppurative conditions, and are increased in virulence from passage through animals. Ward says that streptococci are the organisms usually found in the teat canal. We are indebted to Nocard for first demonstrating the fact of galactogenous infection of the mammary gland.

I will now very briefly touch upon the more common organisms found in milk, confining myself as far as possible to probable infection before leaving the cowsheds. Backhaus found that the first milk drawn from the teat contained 10,400 bacilli per cc., and that the last was sterile. Schultz found 80,000 organisms in poor milk. Harriette Chick found the *Bacillus coli communis* in seventeen out of 239 samples of new milk.† This was explained by contamination in cowsheds. In the same report it will be found that Balfour Stewart demonstrated *B. enteriditis sporogenes*, either alone or in conjunction with *B. coli*, in forty-nine samples out of 213. The former was found to be pathogenic in thirty-eight of these samples.

In 1900-01,509 milks drawn from town dairy farms were examined for *B. coli* and *B. enteritidis sporogenes:* 24·7 per cent. contained the coli and 5·8 the *enteriditis sporogenes*. From country farms, 44·4 per cent. contained the former and 9·6 the latter ("Report of the Medical Officer of Health, Liverpool," 1898-02). Other organisms found in milk are streptococci and staphylococci, as before mentioned; these are also found in the teat canal.

Having now pointed out that milk is often taken from cows under filthy conditions, that the surface of the cow's body is covered with excremental matter swarming with bacilli, that the udders and cow herself is often diseased, that disease organisms exist in the udder and milk, I will endeavour to briefly demonstrate the probability of certain diseases in human beings being conveyed in the milk from the cow.

* *Journal of State Medicine*, 1897, xol. v.

† "Report of the Thompson Yates' Laboratory, Liverpool," 1900, vol. iii., part 1.

Scarlet Fever.

No one organism has yet been found and proved to be the cause of this disease, several have been described by various observers as being associated with it ("Bacteriology of Milk," Swithinbank and Newman).

Numerous cases have been described pointing to direct or indirect infection from the cow. The Hendon outbreak in 1885 is an illustration. It affected St. Pancras, Hampstead, St. Marylebone and Hendon. This disease followed the milk cart from a certain farm; the cows were examined and these were found to be suffering from a skin disease and sores on the udders and teats. Calves were inoculated with material from these lesions, and a disease came on simulating that in the cows. Researches were made by Dr. Klein and summarised by Sir George Buchanan. The following are some of the chief points:—

(1) From lesions both in man and cow, the same micrococcus can be separated and artificial subcultures made from it.

(2) These when inoculated into calves, whether obtained from man or cow, can produce every symptom of the disease in the calves excepting the udder lesions.

(3) Subcultures made from human scarlatina when inoculated into recently-calved cows is followed by manifestations of the original Hendon disease with the udder lesions.

(4) Calves fed on subcultures of human scarlatina take Hendon disease.

(5) Children fed on milk from cows suffering from Hendon disease contract scarlatina.

(A full report of foregoing can be found in "Local Government Board Report,"* 1885. W. H. Powers, F.R.S.)

Other outbreaks traceable to infection through the medium of the milk occurred at Wimbledon and Merton, 1886-7 ("Local Government Board Report,"), Sutton Coldfield, 1891 (*British Medical Journal*), Charlton, 1892 (*Public Health*, 1891-02), Glasgow, 1892.

Diphtheria.

Klebs discovered the bacillus of diphtheria in 1883, and soon after Löffler was successful in isolating it in separate culture.

Klein has carried out investigations to show whether cows are inoculable with diphtheria. He injected 1 cc. of culture of Kleb's bacillus derived from human diphtheritic membrane under the skin of two cows. Besides other lesions this was followed by vesicles and pustules on the udders. He demonstrated the *B. diphtheriæ* in the material from these lesions under the microscope, and also in culture; eventually the organism was excreted with the milk. Scrapings from these lesions inoculated into calves was followed by a similar disease ("A Treatise on Hygiene and Public Health," Stevenson and Murphy; also "Local Government Board Report").

Dean and Todd reported an outbreak occurring in 1901. People occupying certain houses obtained their milk from two cows. They were suddenly stricken with diphtheria and others with diphtheritic

* The report upon the Hendon outbreak has been severely criticised by many veterinary observers.

throats. Persons living in one of these houses who drank milk after sterilisation escaped. The cows were found to be suffering from an ulcerative disease of the udder. From these lesions and from the milk cultures of the diphtheria bacillus were isolated.

Guinea-pigs inoculated with the bacilli from the human source and from the cow's udder succumbed to the disease. Diphtheritic antitoxin completely protected the experimental animals. The milk and material from the udder lesions were examined under the microscope, and a bacillus which could not be distinguished from the Klebs-Löffler bacillus was found (*Journal of Hygiene*, April, 1903). Bowhill has isolated the diphtheria bacillus from milk (*Veterinary Record*, April 8, 1899). Other outbreaks traceable to infection through the medium of the milk occurred at Worcester in 1891 (*Public Health*, 1891-92), Glasgow in 1892 (*British Medical Journal*, 1897, vol. ii).

Throat Affections.

I have already attempted to point out how comparatively common pathogenic organisms are found in milk, and that the surroundings, condition, and health of the cow conduce to this condition of things. It therefore follows that persons consuming milk must ingest these organisms with it, and in their passage they are either retained in the throat or pass to the stomach and intestines. This being the case, throat, stomach, or bowel symptoms follow from the irritation set up by the organisms or their products.

At Bedford, June, 1902, an outbreak of septic sore throat occurred. The symptoms were swelling of the throat, fauces, palate and uvula, &c., and in a few cases gastric and intestinal trouble. There were forty-two cases altogether, and in every case the milk came from the same source or dairy. *In some families the milk was boiled*, and *these escaped*. The cows were examined, and some of them had what is described as sore udders ("Report of the Medical Officer of Health, Bedford County Council," 1902).

Diarrhœa.

With reference to diarrhœa, Delepine says that infected milk is the commonest cause of infantile diarrhœa. Ballard and Newsholme are of the same opinion. Booker ("Ninth International Medical Congress," vol. iii., February, 1890) describes a number of varieties of organisms which enter into the causation of infantile diarrhœa, the most important being *Streptococcus enteritidis*, *Proteus vulgaris*, and *B. coli*. Klein isolated an organism from cases of epidemic diarrhœa, the *B. enteritidis sporogenes*. This organism was found in three successive outbreaks. Now these organisms, especially the last one mentioned and the *B. coli*, are frequently found in the excrement of cattle, particularly when suffering from diarrhœa, and this ailment, as every veterinary officer of health knows, is commonly met with in dairy cattle, and the tail, hind quarters and the posterior part of the udder are contaminated with fæcal matter.

Causton and Lesage, &c., say that the *B. coli* is the commonest cause of epidemic diarrhœa in infants.

According to Dr. Still, 90 per cent. of deaths of children from diarrhœa is due to contamination of cow's milk.

I have committed these few notes to paper, not from any fancy

that I was qualified in any way to do so, but because I have seen the good effects which follow veterinary inspectorship of dairy cattle. It behoves us, considering the alarmingly low birth-rate, to subscribe our iota towards keeping alive the children that are brought into the world, and this can be done by bringing forward to the proper authorities the danger to child-life through drinking milk containing injurious germs to war against and vitiate their newly-born cells. It is our duty as veterinary surgeons to see that the most important article of food—food which enters so largely into the diet of children and invalids—should leave our patients (the cows) in as pure a condition as possible, and this can be brought about if it is made possible for veterinary officers of health to be appointed.

I have purposely omitted mentioning any other contamination of the milk excepting that subscribed to it by the cow herself directly and indirectly.

Under the Order of 1885 local authorities may make regulations for inspections of dairy cattle; but how many take advantage of this power? Why is this? It is because they are not aware of the absolute necessity of these inspections, and in some cases probably because of the expense.

When these inspections were inaugurated in my districts, it was quite common for my reports to contain several cases of mastitis, ulcerative condition of the udders and teats, and various other lesions. But now they are few and far between, because the cows are taken more care of, kept cleaner, udders cleansed before milking, and the cowman takes a greater interest in his cows. At the first symptom of anything wrong the cow is isolated and the sale of the milk suspended; if considered necessary, the cow is disposed of, and probably merely moves from one dairy to another where less strict supervision is exercised.

I have never had any real trouble with the farmers, my instructions are always carried out as far as I can tell; only now and again I have had to ask the Medical Officer of Health to visit the farm with me so as to bring a little more pressure to bear.

It may not be out of place to mention here that I have always met with most courteous treatment from the medical officers; they never interfere, and, in fact, upon occasions have been a help to me in my relations with the Councils. My duties commence and end with the cow. I work independently of the medical officers, and report direct to the Councils.

A REVIEW OF RECENT INVESTIGATIONS AND OBSERVATIONS UPON THE IMMUNISATION OF CATTLE AGAINST TUBERCULOSIS.

BY LEONARD PEARSON, V.S.

(*Continued from p.* 110.)

HUTYRA, Director of the Institute for the Study of Infectious Diseases of Animals of the Royal Veterinary High School in Budapest, and for the Hungarian Government, made a number of experiments on the immunisation of cattle by the method of von Behring and other similar

methods. He also made a series of experiments in which different races of tubercle bacilli were used for the purpose of immunisation. Control inoculations were made intravenously with virulent bovine tubercle bacilli. One of the cultures used for immunisation was from a tuberculous monkey. This culture was found to be highly virulent for guinea-pigs and for horses—for the latter when administered intravenously. One of the cultures used was of human tubercle bacilli from the cervical glands of a girl; and another human culture was from the pleuritic exudate of a consumptive. The culture that was used for making the test inoculation upon the vaccinated cattle was of von Behring's bovine tubercle bacillus No. 18. Of the four controls that were inoculated for the purpose of comparison with the vaccinated animals, one was inoculated with von Behring's culture No. 18, and the other three with three different cultures of bovine tubercle bacilli that were isolated from different tuberculous cattle—the first from a liver of a cow, the second from the udder of a cow, and the third from the lung of a cow. The results showed that the culture of tubercle bacilli from a monkey and the two cultures of human tubercle bacilli used by Hutyra were as valuable, or more valuable, for the protection of cattle against inoculation with bovine tubercle bacilli than was the vaccine prepared by von Behring.

The experiments of Hutyra are especially interesting because they are almost the only experiments that have been made in Europe and reported upon, wherein animals vaccinated but twice, after the method now recommended by von Behring, have, together with controls, been tested as to their immunity by inoculation with virulent bovine culture, and wherein *post-mortem* examinations were afterwards made and published.

Since all the animals vaccinated with von Behring's vaccine became infected with tuberculosis in some degree, and since one of them appeared to have received no immunity whatever, it cannot be said that the claims of von Behring are proved by the results of this experiment. It must, however, be borne in mind that the quantity of infectious material that was used for testing these animals was very great, and the resistance that was shown by some of them after this ordinarily overwhelming inoculation is noteworthy and instructive. The higher average immunity shown by the animals vaccinated with Hutyra's own cultures may have been due to the fact that he used fresh, living, active bacilli, in contradistinction to the dry, more or less attenuated organisms in von Behring's vaccine.

Marks has found that there is great difficulty in emulsifying the von Behring vaccine in such a way as to make possible accurate dosage, and that the vaccination of calves is not always unattended by danger. He found that in a number of herds, after the first vaccination, from one-fourth to one-third of the calves showed dyspnœa and a cough immediately after the injections. In some instances where the calves were suffering with infectious pneumonia in the latent form, the vaccinations appeared to excite the disease. In one case calves were so badly affected by the vaccination that it was necessary to kill five out of twenty-six, and in another case three out of twelve. Marks reports: "A well-marked inoculation tuberculosis occurred in four calves of a lot of seventeen. All of the animals refused their food for a few days, and four continued to show a poor appetite and become

thin. In about three weeks it was necessary to kill three of the calves, and they showed extensive tuberculous lesions of the lungs, while the fourth animal died five weeks after inoculation of a well-marked embolic tuberculosis of the lungs. The microscopic examination showed tubercle bacilli, and the lesions were those of a tuberculosis of about five week's duration, small and large, wholly caseous or partly calcareous nodules in the lungs, the bronchial and mediastinal lymphatic glands very much enlarged, caseous, and partly calcareous. In this lot of seventeen head, six in all showed the usual respiratory symptoms. Of these, four were lost and the other two continued to cough. It is to be noted that another lot of seventeen calves vaccinated in another place on the same day with the same vaccine did not show bad results. My experiences with inoculation, which will not deter me from making other inoculations, have shown: (1) The inoculation of apparently healthy calves is not always free from danger; (2) the tubercle bacilli (vaccine) cannot be perfectly emulsified; (3) the doses are variable both from the above cause and because the vaccine loses virulence."

von Behring in his later reports has recommended a system for vaccinating cattle which varies a little from that first advised, and consists of making an intravenous injection of 0·004 gm. dried human tubercle bacilli or one "immunising unit," to be followed in not less than twelve weeks by a similar injection of five times the original quantity, or 0·02 gm.

He now recommends vaccination, especially for calves from three weeks to four months old at the time of the first vaccination. However, older cattle can be vaccinated—cattle from four months to two years of age—but only when the animals are free from all evidence of tuberculosis, and when they have failed to respond to the tuberculin test. In this manner a large number of young cattle have been vaccinated in various parts of Germany, Austria, and Hungary.

Vaccinations have been carried out on a large scale on the Sarvar and Ujmajor estates in Hungary. The work there has been under the direction of Dr. Strelinger, who has under observation about six hundred vaccinated cattle, some of which have been vaccinated as much as eighteen months, and he is satisfied the cattle have not been injured by vaccination; their thrift and growth are not unfavourably influenced.

Strelinger carried out an experiment for the purpose of testing the resistance of vaccinated animals as follows: Four calves that appeared to be in good health, and that did not respond to the tuberculin test, were vaccinated systematically and repeatedly with increasing doses, so that they might be highly immunised. Two animals about four months old were vaccinated twice in the usual way. One animal about four months old was vaccinated once, and with these was placed a control animal that was proved by the tuberculin test to be healthy. Six of these animals, that is, all but two of those that were most highly immunised, were inoculated intravenously with a small dose (0·0005 gm.) of bovine tubercle bacilli. Two months later all these animals were tested with tuberculin. It was found that of the two animals that had been vaccinated repeatedly one did not respond to the tuberculin test, while the other responded in quite a typical manner, the temperature remaining high for four hours the two cattle that

were vaccinated twice reacted to the test, the temperature remaining high for twelve hours; the animal that was vaccinated once reacted to tuberculin, the temperature remaining high for sixteen hours. The control animal that was not vaccinated, but which, nevertheless, was inoculated intravenously with bovine tubercle bacilli, as the others were, reacted strongly to the tuberculin test. As all these animals were still living at the time of the report, it is quite impossible to draw final conclusions from the experiment.

The same writer has furnished some interesting facts upon the effect of tuberculin upon cattle that have been vaccinated. Forty-five cattle that had been vaccinated for twelve to sixteen months were tested with tuberculin. Of these, thirty-six did not react, eight gave a febrile reaction that lasted but a short time, and one gave a reaction lasting several days. Twenty-three cattle were tested that had been vaccinated for from six to eight months. Of these, twelve did not react; ten gave a febrile reaction lasting a short time, and one gave a reaction lasting several days. It appears, therefore, that of the sixty-eight vaccinated cattle that were tested with tuberculin, twenty, or almost 30 per cent., responded to the tuberculin test in a way that is, in the practical testing of herds, regarded as denoting the presence of tuberculosis. This is a matter of much practical importance, because it shows that after an animal is vaccinated with von Behring's vaccine the diagnostic value of the tuberculin test as applied to that animal is greatly diminished. It should be stated that few of the above animals reacted again when tested some months later, although some reacted several times.

It is estimated by von Behring that in the latter part of the summer of 1904 as many as 10,000 animals had been vaccinated with his vaccine. von Behring says: "When I say that approximately 10,000 calves have been vaccinated with good results, I mean that the method of vaccination is not injurious when it is intelligently carried out according to my directions, and that the vaccinated animals during the time that they have been under observation are in better condition in respect to such symptoms as are associated with progressing tuberculous disease than animals of the same sort not vaccinated and kept under the same conditions."

There is in von Behring's reports a remarkable lack of direct experimental evidence as to the value of the two-treatment method of vaccination he is now recommending. With the exception of Hutyra's report there is practically nothing on record to show that definite comparative trials have been instituted to show to what extent vaccinated animals are more resistant to infection than unvaccinated animals.

At Koepenick, near Berlin, an interesting and valuable experiment is being carried out in the large herd of Mr. Bolle. A portion of the calves are being vaccinated, and others are left without vaccination; it is proposed to grow these calves to maturity, put them into dairy herds or fatten them for beef, and in this way, throughout the entire lives of the animals and after they are killed, study and make comparisons between the vaccinated and unvaccinated animals.

From the facts that have been presented in this paper it will be seen that the vaccination of cattle against tuberculosis is a gradual and natural outcome of immunisation experiments that have been made upon animals with extracts from tubercle bacilli, with ground tubercle

bacilli, with dead tubercle bacilli, and with living tubercle bacilli non-virulent for the animals vaccinated.

There has been some discussion, part of it (in Germany) rather acrimonious, as to whom credit should be given for the discovery of anti-tuberculous vaccination as applied to cattle. It is claimed by Neufeldt that the credit should be given to Koch for his work reported to the London Tuberculosis Congress in 1902. He says: "The foundation for the success of tuberculosis immunisation was laid by the investigations of Koch upon the relations between human and bovine tuberculosis. The proof that is furnished by him as to the non-identity of these two diseases furnished us with the key to immunisation against tuberculosis; with one stroke it was made possible to immunise animals of a species that is susceptible only to one form of the virus by treating them with the other forms of virus." If it is true that the discovery of the non-identity of human and bovine tubercle bacilli and the collateral fact that cattle are not infected by tubercle bacilli of what is now commonly known as the human type, then the credit for the discovery that has made immunisation possible belongs not to Koch, but to Theobald Smith.

It is well known in this country, and the fact cannot be expressed too clearly, that the first definite and unimpeachable evidence of the existence of two types of mammalian tubercle bacilli was that furnished by Theobald Smith in 1896. His exhaustive paper on this subject was published in 1898.* The evidence furnished in this classical paper by Smith as to the existence of two types of tubercle bacilli is even more complete than that furnished by Koch in his paper read in London three years later.

If credit for the discovery of vaccination against tuberculosis should go to the men who first successfully employed that principle of vaccination against tuberculosis which governs the vaccination of cattle as now practised, then the work of Dixon, Trudeau, and de Schweinitz must not be overlooked. Dixon discovered in 1889 that a rather high degree of immunity to tuberculosis could be produced artificially in experimental animals by preliminary inoculations with attenuated tubercle bacilli.

Trudeau reported in May, 1893, that by preventive inoculations of living bird tubercle bacilli in rabbits he got undoubted evidence of a marked degree of artificial immunity. He was able then to demonstrate by means of living animals that in the rabbits having previously received the preventive injections of living bird bacilli, the tubercle inoculations at first gave rise to a violent reaction of the tissues which ended generally in recovery, while the tuberculous process similarly induced in the controls was steadily progressive. Trudeau discovered that toxic immunity and bacterial immunity did not go hand in hand, and that while he could accustom animals by gradually increased doses at intervals to bear with impunity amounts of tuberculin and other toxic products of the bacillus which at first would have proved fatal, this toxic immunity did not protect the animal against the infection of its tissues by living virulent bacilli that were subsequently inoculated. "It was only when I began to make use of living cultures as a protective inoculation that I met any encouraging results, and my experience would indicate that the living germ is essential to what success has been attained in the production of artificial immunity against tuberculosis."

* *Journal of Experimental Medicine*, vol. iii., Nos. 4 and 5, 1898.

If credit for this discovery should be given to the investigator who first succeeded in increasing to a very high degree the resistance of cattle against inoculation with virulent bovine material, and in producing considerable, but not complete, immunity, then it is McFadyean who should receive the honour. McFadyean's publications in June, 1901, and in March, 1902, are the first publications in any literature upon experiments regarding the immunisation of cattle against tuberculosis. Unfortunately, the work of McFadyean was not continued, but his few observations, as they stand, are very important, and unquestionably mark the beginning of work in a new field. They are quite as convincing as von Behring's experiments, as published in 1902 in part 5 of his "Beiträge."

If credit for this discovery should be given to those who made the first experiments in which it was proved by *post-mortem* examinations that cattle were definitely and highly immunised against virulent bovine tubercle bacilli by *systematic preliminary treatment with human tubercle bacilli alone*, and in which the immunity of animals so treated was measured with that of untreated animals, then a claim may be entered by Pearson and Gilliland for their work published in 1902.

To von Behring unquestionably belongs the credit for first proposing a definite method for the practical application of vaccination of cattle against tuberculosis. This method, however, had not been tested before it was proposed, and has since been modified in some particulars, and even now, after three years, there is still an amazing dearth of experimental proof of its efficiency.

It has been shown that vaccination can be practised in such a way as to be entirely harmless to the vaccinated animals; that such calves grow and thrive quite as well as unvaccinated healthy calves of the same breed and age. On the other hand, vaccination is not always unattended by danger, as is shown by the statements of Casper and Marks in their reports upon the use of von Behring's vaccine.

Among the many important questions that it is still necessary to solve before vaccination can be made available for the protection of animals against tuberculosis on a large scale, are those in relation to the shortest and most economical procedure that will give effective protection, and in relation to the duration of immunity. von Behring has pinned his faith to the two-vaccination method with dried virus and a long interval between vaccinations. Under his direction a large number of cattle have been vaccinated in this way, so that within a few years, if careful records are kept, and if these are published, there will be a large amount of evidence as to the efficiency of this system under diverse practical conditions.

The question as to the duration of immunity is an exceedingly important one, and the practical value of the whole procedure will depend largely upon the results of experiments in relation to this factor.

It has already been shown that immunity will continue for a year. To say at the present stage of the work that immunity will last during the entire life of an animal is to make a statement for which there is absolutely no experimental proof. The problem of immunity in tuberculosis is so different from that in relation to other diseases that have been studied in this regard that it is not safe to conclude that, because immunity lasts for a number of years in

relation to a given disease, therefore it will last for a number of years in relation to tuberculosis. Upon this point nothing but experimental evidence can be convincing or useful. Modes of vaccination against tuberculosis, as illustrated by the experimental work that has been done on this subject, differ greatly in respect to the rapidity with which the vaccinations are made, that is, the length of the intervals between vaccinations. It is to be observed that a very high degree of immunity has been produced by repeated injections at short intervals, and is shown by the work of Pearson and Gilliland, Neufeldt, Hutyra, and some of the earlier work of von Behring.

It must be remembered that the vaccine that has proved to be so effective in immunising cattle consists of living tubercle bacilli of human type. If these organisms retain their life and virulence for a long time in the body of the bovine animal, and especially in the edible parts of the carcases, or if they are excreted through the udder, it will be seen that the vaccination of cattle may have a very direct relation to the production of tuberculosis in man. The importance of this side of the question has been referred to by Marks, who asks that investigations be made to determine how long the living tubercle bacilli that are injected into the circulation remain alive and virulent, so that meat inspectors may be properly guided. Few observations have been made upon this point. There are, however, two which merit consideration.

De Schweinitz and Schröder treated a cow as follows:—

1902.
July 19.—10 cc. "moderately virulent" human tubercle culture intravenously.
Aug. 6.—10 cc. human tubercle culture intravenously.
,, 20.—10 cc. human tubercle culture intravenously.
Sept. 20.—10 cc. human tubercle culture intravenously.
Oct. 7.—10 cc. human tubercle culture intravenously.
1903.
Aug. 6.—Killed.

Upon *post-mortem* examination of this cow it was found that "the entire right lung was sprinkled with minute white nodules about 1 mm. in diameter." "The other organs and glands did not show tuberculous lesions, and while there were some circular red patches in the mediastinal glands, guinea-pigs inoculated from these glands did not become tuberculous. Guinea-pigs inoculated from the lung of this animal died of tuberculosis, showing that there were still living tubercle bacilli in the lung tissue." This convinces the authors that "the presence of these living tubercle bacilli seem to be due, therefore, to the inoculation of the human culture, and not to the infection which the animal might possibly have got from the diseased animals in the stalls to which it has been exposed. . . . The results of this single experiment do not seem to be very encouraging. While the animal treated with the human germ was apparently resistant to the bovine disease, at the same time the human germ which had originally been injected was still persistent in the animal's system, and was probably fairly widely distributed."

De Schweinitz and Schröder also remark: "The practicability of such a method as applied to animals that are to be used as food, or for the purpose of producing milk, is questionable, as it is

apparently impossible to say how long the human tubercle bacilli may remain alive."

The other observations of interest in this connection are recorded by Karlinski, who made upon goats a series of experiments for the purpose of determining the resistance of the goats of Bosnia to injections of human tubercle bacilli. Most of these experiments consisted in the intravenous inoculation of pregnant goats with human tubercle bacilli for the purpose of determining the action of such bacilli administered in this way upon such goats and their progeny. For these experiments four cultures were used; two were obtained from human sputum, one was obtained from the kidney of a tuberculous man, and the origin of the fourth is not stated.

In this series of experiments twenty-two goats were inoculated intravenously; each received but one inoculation, consisting of from 0·01 gm. to 0·3 gm. tubercle bacilli. After the birth of the kids, examinations were made of the milk of the mother goats. The milk was centrifuged and examined microscopically. Tubercle bacilli were found in the milk of seven goats, and the kids fed upon the milk of these goats became infected with tuberculosis. All the inoculated goats were infected with tuberculosis, and upon *post-mortem* examination lesions were found in the lymphatic glands, and in a few instances in the lungs. The goats were inoculated from four to six months before the birth of their young. No clinical alterations or *post-mortem* lesions were at any time apparent in the udder of five of these animals that produced infectious milk, while in the other two there were lesions of tuberculosis in the udder. These observations are sufficient to justify the exercise of great care in the application of vaccination. For the present, surely, the use of vaccination should be reserved for young cattle that will not come into milk, and that will not be slaughtered for use as food for a long time after vaccination.

The work that has thus far been done upon the immunisation of cattle is sufficient to justify the most sanguine expectations. The absolute proof that has been furnished that cattle may be rendered highly immune to tuberculosis by a process that is not harmful to them is a long forward step. If a practical and safe method for applying immunity shall be devised, as now seems probable, the result cannot but be of great advantage to agriculture and to the public health.

Clinical Articles.

NOTES ON A FEW INTERESTING SURGICAL CASES.

BY E. C. WINTER, F.R.C.V.S., LIMERICK.

(1) Dentistry Extraordinary.

The subject was a black gelding, five years old, seen in May last year, suffering from an enlargement of the inferior maxilla, at the off side, opposite the second molar tooth. There was no history of an injury. The patient was cast and chloroformed, an incision was made along the middle line of the enlargement, the skin reflected, and a small fistula in the bone exposed and enlarged, a small spicule of loose bone was removed and the wound dressed with a strong caustic. The owner was asked to bring the horse back in a week, but it was three months before he did so. The external wound had then healed, but a couple of fistulæ had formed in the enlargement, which had assumed an enormous size (about 5 inches long, and 2 inches deep, at the most prominent part). The horse was again cast and chloroformed, the skin incised as before, and reflected for a length of about 10 inches. Radical treatment being deemed necessary, a saw was taken and the enlarged bone cut away, below and from both sides, till the jaw-bone assumed something like its normal size.

The fistulæ were then drilled out, and on using the probe some loose pieces of bone were found in the opening, which was enlarged as much as possible, and several pieces removed. Tooth trouble being suspected it was decided to remove the second molar, although the tooth was fast in the alveolus, and nothing could be seen wrong on examining the mouth. This operation proved rather difficult as the tooth sat tightly, and fracture of the weakened jaw bone was to be dreaded if violence were used. However, steady traction and the use of the first molar as a fulcrum effected the desired end. On examining the extracted tooth it was seen that about an inch, or $\frac{3}{4}$ of an inch, of it remained in the alveolus, and the tooth had literally been pulled in two, not broken off. It was then found impossible to remove the other part of the tooth, or the several small pieces of broken bone found in the alveolus, either through the tooth socket above or the lower opening, and an incision was made in the wall of the alveolus, corresponding to the size of the tooth extracted, through which the *débris* was taken away. Both plates of the maxilla were star fractured inside, and the fang of the molar had evidently been also broken, as a large callus had formed round its extremity. It was this latter which had prevented the extraction at first, and which broke off on strong traction being applied. The original fracture in the tooth had been repaired.

The alveolus was plugged with antiseptic tow after all the particles of bone were removed, and the interior surfaces of both plates of the maxilla scraped, and the case made an uneventful recovery. There is very little mark of the operation, and the resulting scar is not noticed a couple of yards away.

(2) NEURECTOMY.

Subject, a black mare aged 16. This mare had been driven in harness for several years by a lady who was anxious not to lose her services if possible, and who consulted me in the spring of last year.

The mare had been going lame intermittently for three years previously, on her off fore foot, and had several large splints on that leg as well as a nasty scar on the pastern, and the foot was contracted at the heel. Navicular disease did not seem to be present, and I tried blistering the splints and the slight enlargement on the pastern. This treatment, twice repeated, had very little effect on the lameness. I then decided on median neurectomy. Immediately after the operation the mare trotted sound, and when the wound was healed she went back to her work and has been sound now for six months. I believe the lameness was due to the splints, as cocaine injected below the fetlock gave negative results.

In two cases of the lower operation about the same time I was not so successful. In one old-standing case of foot-lameness, without any definite symptoms, matter broke out at the coronet and heel, a week after operation, and the horse was destroyed. I did not get an opportunity of making a *post mortem*. In the other case the horse is still lame, although there is no sensation in the foot, and nothing to show where the lameness comes from. I have always had better results from the high than from the low operation.

(3) FIBROUS TUMOURS IN THE SHOULDERS AND BACK IN THE HORSE.

CASE 1.—Subject, a bay van gelding, aged 13. This horse had an enormous tumour just above the point of the shoulder, in the prescapular region, due to continued pressure from a badly-fitting collar, with, probably, discomyces for a nucleus. He was carefully cast and chloroformed, and the tumour dissected out. The aperture left alarmed the owner, but the healing process was uninterrupted, and the horse was at work in two months. The resulting scar is scarcely noticeable. The tumour was kidney shaped and weighed over two and a half pounds, and had a minute quantity of pus in its centre.

CASE 2.—Subject was a black gelding in the same stable, whose back had always given a lot of trouble. On examination I found a hard swelling, deep down, where the posterior part of the pad pressed. The owner being keen on another operation, and the writer no less keen, it was decided to go to work at once. The patient was cast and chloroformed, as in the first case, and a deep vertical incision made over the seat of the swelling. The tumour was again dissected out, being practically torn away from the ribs. As in Case 1, the resulting wound looked as if it could never heal up. However, the patient did well and the scar is now very small, although the wound took a long time to heal (about three months).

I have had several similar cases in shoulders, where the tumours were not so large, and they have all done well after excision. The tumour in the back weighed a pound and a half.

Similar tumours in the shoulder are not uncommon in cattle in my experience; in those cases they are nearly always of tubercular origin, with perhaps a bruise as an exciting cause. In these cases again excision seems the only remedy.

NECROSIS OF ONE OF THE TURBINATED BONES IN A MARE.

BY J. J. O'CONNOR, M.R.C.V.S., PROFESSOR OF SURGERY, ROYAL VETERINARY COLLEGE OF IRELAND.

A GOOD-LOOKING six-year-old black cart mare proving useless owing to an affection of the nose, had been presented by a farmer to a poor man in the city, who brought her to the college for treatment, and said that he believed the origin of the disease was an accident, but of what kind or when it occurred he could not say. The mare presented the following symptoms: a loud nasal respiratory noise; a hard inflammatory swelling about 4 inches long from above to below, and about half an inch in depth across the lower extremity of the nasal bones; a slight mucous discharge from the left nostril; a profuse fœtid purulent discharge from the right nostril, and an enlargement of the inferior extremity of the right anterior turbinated bone, almost occluding the nasal passage, having the appearance of granulation tissue and revealing on palpation hard rough areas, here and there, due to exposed pieces of necrosed bone.

An operation having been decided upon, it consisted in making an incision about 5 inches long into the nasal cavity to the inner side of the false nostril and parallel to the nasal bone, severing the diseased turbinated bone above the affected part and separating it below from its attachment to the nasal bone by means of bone forceps, remova of the separated portion with the fingers, and of remaining portions with a sharp pronged retractor, and finally the insertion of a plug of cotton wool into the nose to arrest the hæmorrhage, which was fairly profuse. When the plug was removed the next day the respiratory noise was much less marked. The subsequent treatment comprised daily irrigation of the cavity with an antiseptic lotion by means of Reid's pump. The result was that after sixteen days the patient was discharged cured, all the symptoms having practically disappeared. The facial swelling became much reduced in size, the fœtid odour disappeared, the nasal gleet became very slight and inoffensive, and no respiratory noise or distress persisted.

Microscopic examination of the tissue removed showed that it was mostly fibrous and apparently of inflammatory origin.

RUPTURE OF THE LIVER IN A HORSE.

BY H. GIBSON, B.A., M.R.C.V.S., BELFAST.

THE subject was a black gelding, 5 years old, used for funeral work up to morning of its death. He was sent out on a long journey, but the coachman noticed that something was wrong and turned back when he had gone about four miles. I was called to see him at eleven o'clock, when I found him blowing slightly, pulse 52 and temperature 102·4° F., mucous membrane normal. As a number of horses in this establishment were suffering from influenza, I diagnosed it as the beginning of an attack and treated it accordingly. At three o'clock was called out again as the horse had got worse. On my arrival I

found him lying down, and on raising him he stood a few seconds and then dropped "all of a lump." On examination of mucous membranes I found them extremely anæmic, and suspected there must be internal hæmorrhage. The horse died in about fifteen minutes.

Post mortem.—On opening the abdomen there was a great flow of blood. The liver was badly affected with fatty degeneration, and some of the blood-vessels had ruptured. The capsule for some time had evidently retained the blood, but at last gave way. The lungs were decidedly congested, and were in all probability the cause of the train of symptoms first noticed.

BRAIN AND HEART SYMPTOMS, DUE TO ASCARIDES, IN A MARE.

BY H. GIBSON, B.A., M.R.C.V.S., BELFAST.

SUBJECT.—A brown cart mare, aged 10. This animal for the last four years had been doing very heavy carting, which often occasioned very severe strains. During the last twelve months she had shown peculiar paralytic symptoms, she occasionally carried the head in a stiff erect position, and her eyes had a glassy stare. When there was any irregularity of the ground she often stumbled and fell forward. During this period the animal had four attacks of colic, and each of these lasted about three days, and during the whole of each attack the pulse resembled that of a dying animal. Temperature was subnormal and heart was very irregular and intermittent. The last attack appeared more severe and the animal succumbed to it.

Post-mortem Examination.—On opening the abdominal cavity it was very evident that "twist" was the cause of death, as the intestine had passed through a rent in the mesentery and become strangulated. I next examined the heart and brain, but could find nothing abnormal in them. The stomach was very much dilated to about twice its normal size. On opening it I found it filled with innumerable specimens of Ascaris Megalocephala.

Knowing that worms in dogs set up brain and heart symptoms, I am of the opinion that these symptoms in this case were due to the worms.

PARTIAL RUPTURE OF THE STOMACH WALL, FOLLOWED BY LAMINITIS, CONGESTION OF THE LUNGS, AND ENTERITIS.

BY H. GIBSON, B.A., M.R.C.V.S., BELFAST.

Subject and History.—A black gelding, 10 years old, used in funeral work. He returned home after a long journey on the evening of January 3. The coachman groomed him as usual and supplied him with a little hot bran, and left the usual feed of oats and chopped hay.

I was called in at 10.30 p.m., about one and a half hours after

the horse came to the stable, and I noticed that he had taken his bran but had not touched his oats or hay. On examination I found distressed breathing, very marked contraction of abdominal muscles at each respiration, pulse thready and weak and about 80 per minute. The animal had a very distressed expression and occasionally slight regurgitation of gas from the stomach. I diagnosed case as one of tympanitic gastritis, and administered the following draught:—

Ol. terebinth.	ʒii.
Tinct. assafœt....	ʒii.
Acid carbol.	ʒii.
Ol. lini.	oi.

The symptoms remained much the same for an hour, when ʒi. of chloral hydrate was given, and mustard applied to abdominal wall, and the animal left for the night. Next morning all swelling and signs of distress had disappeared; the pulse was 72, but still very weak, and the animal occasionally showed signs of pain by walking round the box. He showed a desire to eat but food was withheld. He was allowed, however, small quantities of tepid water to which 15 min. of Fleming's tincture of Aconite was added. This was given every two hours during the day. That evening he appeared quite lively and looked as if he was going to recover, but the pulse still continued very weak and was again back to 80 per minute.

On the morning of the 5th I was surprised to get a message to say that the animal was unable to move, and found on examination that he had developed laminitis in both hind feet, and was so bad that he could scarcely stand to get his shoes removed. The usual treatment was applied for laminitis, but the next morning the horse was found dead.

Post-mortem Examination.—I found a slight rupture of the muscular coat of the stomach wall just at the entrance of œsophagus. The lower lobes of the lungs were badly congested. On examination of the bowels I found a very severe enteritis, which I believe to have been the cause of death.

STREPTOCOCCIC MAMMITIS IN A CAT.

BY GEO. H. WOOLDRIDGE, F.R.C.V.S., PROFESSOR IN THE ROYAL VETERINARY COLLEGE OF IRELAND.

THE subject was an aged black female cat which had had numerous lots of kittens, the last litter being about eighteen months prior to her present admission to the College. She had been treated for eczema a few months previously, and at that time she appeared perfectly healthy, apart from the skin lesion.

The patient was brought in on February 6, and the owner informed me that the swelling which was present had existed for about three weeks, but had become firmer than it was at first. The cat herself was getting dull and listless and refused food and milk. She had never shown any signs of pain beyond a little discomfort on manipulation. On examination I found two more or less circumscribed swellings at the

posterior extremity of the abdominal wall, one at each side of the middle line, very close to the brim of the pubis, and each about the size of a walnut. They had a rather firm or tense consistency on manipulation, and extending backwards to the inguinal region from each swelling was a cord-like thickening about the calibre of one's finger. This cord terminated on each side with a slight enlargement immediately over the external inguinal ring, where it appeared to be more or less fixed. The foregoing appearances made me suspect a double inguinal hernia, but I was unable to distinguish any viscus in the anterior swellings, and attempts at reduction were also futile. Consequently I concluded that they were most probably tumours, and this conclusion was strengthened on further examination by the discovery of a small well-defined tumour about the size of a hazel nut in the most anterior portion of the mammary gland on the right side. Yet I considered it doubtful that tumours could have developed to that size in the short space of three weeks.

However, I decided to operate, and prepared all the instruments necessary for the removal of tumours or the reduction of hernia. I anæsthetised the cat with A.C.E. mixture, using Hobday's inhaler, and washed, removed the hair from, and disinfected, the sites of operation. I then proceeded cautiously, as I was still in doubt as to the nature of the condition, and was very much surprised when I had completely incised the skin on one side and a quantity of thick creamy pus exuded closely resembling that characteristic of strangles in horses. The cavity also contained a quantity of necrosed mammary tissue. The swelling on the other side was similar in nature. The cavities were irrigated with chinosol solution (gr.j. to ʒj.) and sutured. The anterior tumour was removed and appeared to be adenomatous. The cat recovered from the anæsthetic and appeared fairly bright for the remainder of the day. She unfortunately collapsed the next day and died. Smears had been made from the fresh pus at the time of operation, and on being stained by Gram's method and examined microscopically, numerous chains of large streptococci were demonstrated. On *post-mortem* examination the cord-like swellings were shown to be inflamed lymphatic vessels terminating in the inguinal lymphatic glands.

CARCINOMA OF THE HEAD OF A HORSE.

BY GEO. H. WOOLDRIDGE, F.R.C.V.S., PROFESSOR IN THE ROYAL VETERINARY COLLEGE OF IRELAND.

THE subject was a black mare about 15 years old, and was brought to the College clinique on January 14. The mare had been in the same man's possession some ten years previously, and at that time there was a slight but persistent nasal discharge which may or may not have been in any way associated with the present condition, and as such I note it. A month or two ago she again came into the possession of Mr. D., presenting the same symptoms as when submitted to my examination.

On examining the mare I found a growth about the size of a russet apple on the off-side of the face, with a broad base about the junctions of the nasal, frontal, lachrymal and superior maxillary bones. It had a nasty-looking "fungating" surface, and was emitting a very offensive discharge. There was a considerable blood-stained and offensive discharge from both nostrils, and especially copious from the near one. A thick catarrhal exudate escaped from the inner canthus of the off eye and suggested that the lachrymal duct was affected by the growth. This is easily distinguishable in fig. 1. The mare was constantly licking her nostrils and taking in the filthy discharge, and appeared to be rapidly intoxicating herself, and was consequently very emaciated.

I told the owner that I feared operation would be useless, but he desired me to proceed and see what could be done, and he would come

FIG. 1.—Showing the external bulging of the growth on the face.

and see the mare the following day. Accordingly the mare was cast and secured, and after suitable preparation of the site I proceeded to dissect the growth and found that the bones corresponding with the base were destroyed by the growth, which extended obviously into the sinuses. The hæmorrhage then became very profuse, and concluding that no serviceable end would be attained by continuing, I just removed the exposed portion and inserted plugs of cotton wool to control the bleeding, and allowed the mare to rise. The next day the owner consented to have the poor beast slaughtered, and on removing some of the bones of the side of the face the following condition was observable, as shown in fig. 2.

The new growth had invaded the frontal and superior maxillary sinuses and the greater part of the nasal chamber of the right side.

The inferior maxillary sinus was unaffected. The septum between the frontal and superior maxillary sinuses was completely obliterated, as was also the osseous lachrymal duct in that position. The upper portion of the nasal turbinated bone, where it forms the division between the frontal sinus and nasal chamber, was destroyed, and from that position a long cone-shaped mass of tumour extended, without any other attachment, into the middle meatus of the nasal chamber. As a consequence, both the turbinated bones were widely separated and compressed and the nasal passage practically occluded. The septum nasi and the left nasal chamber and facial sinuses were un-

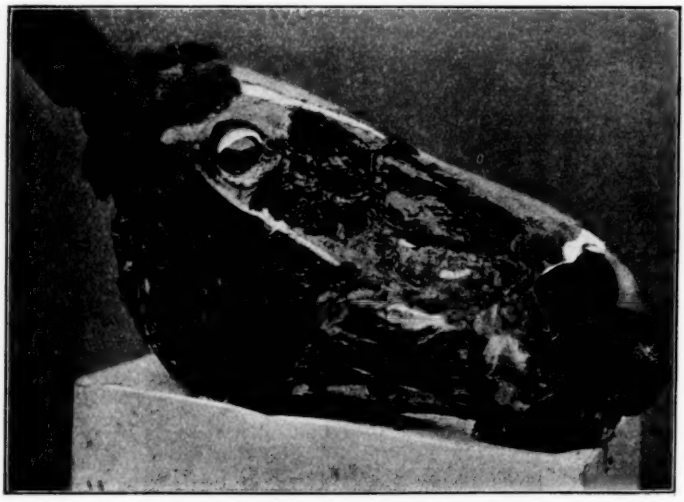

FIG. 2.—Showing the amount of carcinomatous growth inside the sinus and nostril.

affected, so that the copious discharge from the left nostril must have passed from the right side, behind the vomer, to the left chamber.

The lymphatic glands of the head were carefully examined macroscopically, but no signs of new growths could be seen. The internal organs were also carefully examined, but no trace of secondary growths could be found.

I cut and stained sections of the new growth, which presented the usual characteristics of carcinoma.

(I am indebted to Professor Mettam for the photos.)

AN INTERESTING CASE OF HEMIPLEGIA IN THE DOG DUE TO A TUMOUR OF THE SPINAL CORD.

BY ALICE M. CORTHORN, M.B., KENSINGTON, AND FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E., LONDON, W.

(With Appended Note by Frederick E. Batten, M.D., F.R.C.P.)

THIS case has already been published in the VETERINARY JOURNAL, February, 1906, under the title of "An Interesting Case of Hemiplegia in the Dog." After several months of good health the dog died, and at the autopsy the cause of the paralysis was found to be a tumour of the spinal cord. It seems, therefore, worth while to reprint the clinical history and append a note of the pathological condition found.

The patient, an Irish terrier, male, aged 7, which was born in India and had spent three years in that country, came to England in 1902. He was apparently in the best of health until April 13, 1905, when, as he was starting across the road to interview an organ-grinder's monkey, he came into collision with a motor car, and was knocked down, being bowled over twice; he was hit violently on the left side by the front wheels, staggered to his feet, and then fell under the hind wheel, but we cannot quite say whether that passed over him or not. He got up and came back carrying the right hind-leg, which had a long flesh wound on the inner surface of the thigh. The only other feature which was perceptible was a patch of dust on the right shoulder. The wound was cleansed and sutured, the dog appearing to suffer very little discomfort. For the next two days the patient appeared to be in perfect health, but on the night of the 15th he was very restless and continually changing his position. On the 16th he lost his appetite, and from this date began distinctly to lose flesh. He had licked out almost all his sutures and the wound was gaping, but healthy in appearance, and at no time during the illness did this give rise to any anxiety; the animal, however, showed frequent signs of discomfort, and often jumped up suddenly with a cry of pain.

On the 21st, after one of these sudden evidences of pain, he jumped from the sofa to the floor, and it was then noticed that the left fore-leg hung limp and that he hesitated to put his full weight upon it. When attempting to get upon a sofa or chair he would climb, instead of leaping on it as had been his usual habit. He held his head stiffly, and hesitated to lower his neck to take food.

On the 24th he walked about three miles, and it was noticed that although he took an interest in things around and in other dogs, he appeared somewhat slow.

On the 26th he was very dull all day and refused food; when this was forced upon him he returned it.

On the 27th he was unusually quiet, although he ate his dinner as usual and retained it. When out at exercise it was noticed that he gave a short cry every now and again when the left front paw touched the ground, and on the morning of the 28th he refused to rise, and cried when moved. When placed on his feet he stood literally "all in a lump," his back curved, the tail and ears dropped, and he was extremely cold and depressed. The rectal temperature was 100·4°, and it was at this stage that medicinal treatment was commenced.

The diagnosis made was that of acute rheumatism, and 5 grains

of salicylate of soda with a little acetate of ammonia and ether were given twice a day. This seemed to give a satisfactory result, and on the following day the dog was decidedly better and ate his food with relish.

April 30.—On this date we noticed extensive subconjunctival hæmorrhages; nearly the whole of the sclerotic was coloured in the right eye, and there were two large patches in the left. He was dull and lethargic, with occasional spasms of pain, the bowels and bladder acting satisfactorily.

May 1.—The medicine was now changed to aspirin, 5 grains three times a day. The patient was very dull, seemed quite unable to settle himself comfortably in any position, and the pain was very frequent. On the following day he was distinctly brighter, and even went for a fair walk in the afternoon. The right eye, however, was kept closed,

Fig. 1.—Showing the paralysed condition of the fore-leg when the dog was sitting down.

the hæmorrhage beginning to take a rusty-looking colour. On the following day he was more dull, distinctly suffering pain, and scarcely able to climb upstairs. About 2 a.m. he was continually moaning, panting violently, and preferring to stand with his head pressed against something; the neck muscles were in a constant fit of quivering, and he seemed in violent pain when the hand was placed on the back of his neck.

Half a grain of morphia was injected, and this caused him to doze off quietly for a while.

Knowing that a portion of the animal's life had been spent in India, and thinking that possibly *Filaria immitis* might be present, Colonel Nunn, who had had some experience of this trouble, was called in in consultation; he, however, decided against the presence of this worm. The dog was now put on 3 grains of iodide of potassium three times a day.

On May 5 and 6 it was noticed that the hind-legs were moved with difficulty, and were dragged along during progression. The bowels and kidneys were acting normally; there was difficulty in mounting stairs, and a peculiar muco-purulent discharge from the right nostril; when attempting to pass urine the dog almost fell over. On May 7, about midnight, he seemed in great pain, constantly crying, and panting heavily. Morphia injections were administered at 2 a.m. and 8 a.m.; there was considerable discharge from the right eye and left nostril, the latter being continually plugged with crusts. In the afternoon there were definite signs of paralysis in the left fore-leg and, in the evening, of the left hind-leg, the paws being flexed and the leg dragged; the right side of the face seemed a little more expressionless than the left.

FIG. 2.—Showing the hemiplegic condition of both left limbs.

May 8.—Paralysis now more marked; when walking he staggered a good deal and fell over once or twice; the right nostril was plugged with discharge. The dose of iodide was increased to 5 grains, iodide of sodium being substituted for the iodide of potassium, and the dog kept as quiet as possible in a sunny spot. Two curious, symmetrical swellings formed in the region of the neck, one on either side, but they were not tender at all on pressure, and there was no apparent cause for their formation. On the following day the paralysis was more marked still, the left side limbs were dropped, the paws being flexed and the body held in a bunched-up fashion. The temperature at 9 a.m. was 102·2°, and at noon 101·2°. There was no evidence of acute pain, but when walking the animal fell over several times.

May 10.—The temperature varied from 100·6° to 101·6°, the dog seemed drowsy and dull, but cried when being made to move. The

swelling in the glands at the side of the neck had perceptibly subsided; there was a muco-purulent discharge from the eyes and nostrils, particularly on the right side.

A grain of calomel was administered, and the iodide of sodium, 5 grains, given four times a day. On the following day there was a slight improvement both in the condition of the eyes and in the symptoms of the paralysis, and from this date the paralysis commenced slowly to disappear and the appetite returned.

On the 14th he was able to walk some little distance, and by the 22nd, except for a certain limpness every now and again, he was able to run tolerably well; his body, however, was drawn round the left side and the back distinctly curved. He frequently stumbled going up and downstairs, and had not complete control over his limbs. He still had great difficulty in springing upon a sofa or chair, but otherwise appeared to be going on as well as could be expected.

About six weeks after this date a distinct relapse was noticed, there being a failure in controlling the extensor muscles in both left limbs. The administration of iodide of sodium was continued for another fortnight, and improvement was again well marked. The drug was stopped for about a week, and from that time until now there has been no relapse.

January, 1906.—At the present time the dog appears in excellent health and has apparently made a satisfactory recovery.

The dog died on September 7, 1906. On examination all the organs appeared normal except the spleen, which was greatly enlarged and weighed 8 ounces. The bones of the skull and cranial cavity were normal. The dura mater and membranes of the brain were normal. The cortex of the brain, the basal ganglia, the cerebellum, pons and medulla all appeared normal. No irregularity was noticed in the bony canal of the spinal column. The dura mater appeared normal.

On opening up the dura mater along its posterior aspect it was found to be unduly adherent in the cervical region, and adhesion existed between it and the pia arachnoid. At the level of the fifth cervical root on the left side of the cord a small projection could be seen measuring $\frac{1}{2}$ inch in its long diameter, and $\frac{1}{4}$ inch in its transverse diameter. This mass was firmly adherent to the cord and could not be removed. Sections were made through this growth, and it was found to involve the whole of the posterior portion of the cord on the left side. Hæmorrhage had taken place into the cord substance in the region of the tumour, and was of a brownish colour. From naked-eye appearance it was difficult to say what was the nature of the tumour. Its firmness, however, suggested a fibroma.

Sections of the spinal cord were made and stained by the Weigert-Pal and van Giessen's methods.

In sections stained by the Weigert-Pal method an area of degeneration could be seen in close relation with the tumour on the fifth cervical root. This area extended into the grey matter of the anterior horn at this level. In the lower dorsal and lumbar region an area of degeneration could be seen in the crossed pyramidal tract of the left side. Sections stained by van Giessen's method showed that the tumour was composed of dense fibrous tissue, in the centre of which there was yellow pigment, which might be old blood clot. In this

part of the growth there were but few nuclei. Surrounding the dense fibrous mass was a connective tissue which contained numerous nuclei and was continuous with the pia mater, and resembled it closely in structure. The growth did not infiltrate the cord, but simply pressed on it. The portion of cord which lay in immediate contact with the tumour was extremely vascular, and the cells in the grey matter of the anterior horn on that side were greatly diminished in number.

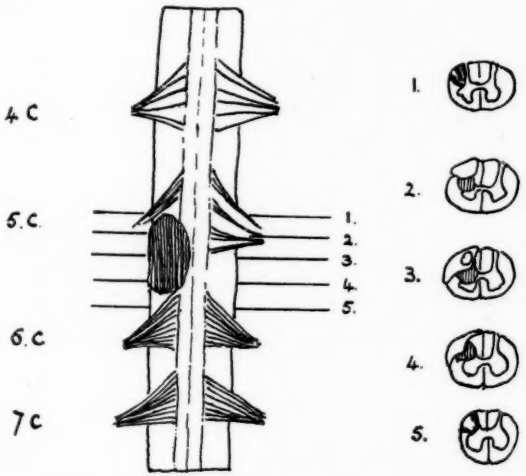

FIG. 3.—Diagram of dorsal surface of spinal cord from the third cervical to the eighth cervical segments, showing a tumour situated on the left side at the level of the fifth cervical root. The transverse lines numbered 1, 2, 3, 4, 5, indicate the level at which sections were made. The appearance of the transverse section of the cord at these levels is shown on the right side of the plate. The shaded area represents the portion of the cord into which hæmorrhage has taken place, the unshaded area on the left side represents the position of the tumour.

Remarks.—All the paralytic symptoms are readily explained by the tumour found in the spinal cord at the *post-mortem* examination, although clinically the hemiplegia appeared to be of cerebral origin.

The nature of the tumour leaves it doubtful whether it was originally a fibroma hæmatoma, or a granuloma in which fibrous formation and contraction eventually took place. I am inclined myself to take the latter view.

OBSTRUCTION IN THE INTESTINE OF A PUPPY CAUSED BY A RUBBER NIPPLE.

BY J. F. MILLER, D.V.M., ASSISTANT IN CLINICAL SURGERY, NEW YORK STATE VETERINARY COLLEGE, CORNELL UNIVERSITY, ITHACA, NEW YORK.

THE patient was a Scotch terrier puppy about six weeks old. When presented it was greatly emaciated, the appetite was poor, and the bowels irregular; there was no vomition. A diagnosis of indigestion was made and a cathartic was administered, this being followed by pepsin, strychnine and charcoal, after each meal.

Three days later the patient had not improved, and was again examined. Palpation of the abdomen for a foreign body was without result, and no abdominal tenderness was present. The dog was again given a cathartic, and this was followed by oil of wormseed in 4-drop doses three times daily. The animal seemed to improve somewhat, and played with a kennel companion.

Three days later, that is, six days after coming under observation, he was found in a state of collapse. Upon palpating the abdomen a foreign body, which seemed highly elastic, and suggested a piece of rubber, could be detected. At this time the condition of the patient did not warrant an operation, and death took place a few hours later. An autopsy revealed an ordinary rubber nipple, such as is used on nursing bottles for infants, lodged in the small intestine about two inches beyond the pylorus. The closed end of the nipple had been bitten off or otherwise removed so that the intestinal contents passed through the elastic tube.

The pressure of the nipple upon the intestinal walls had caused a perforation at one point, with consequent escape of intestinal contents into the peritoneal cavity, and inducing the sudden collapse with fatal peritonitis. The absence of the closed end of the nipple permitting the partly-digested food to pass through it, allowed nutrition to continue to some extent, and prevented the usual symptoms of intestinal obstruction. The absence of vomition seemed the most remarkable incident connected with the case.

TORSION OF THE BOWEL CAUSED BY FOREIGN BODIES AND ACCOMPANIED BY DIAPHRAGMATIC HERNIA.

BY W. GRAHAM GILLAM, M.R.C.V.S., MINEHEAD, SOMERSET.

On Tuesday, February 12, I was called out of bed at 3 a.m. to supply a colic draught. At 6 a.m. the man returned saying the patient was no better, would I come. I arrived there at 6.30 a.m.

Patient.—A bay mare about 15.2, aged 6. Used for cab purposes.

History.—The owner was from home the day previous, during which time she had an attack of colic; she was given a quart of linseed oil and some beer by the driver. She had continued in pain up to the time of my arrival.

Symptoms.—Feeble pulse of 60. Temperature 100·2°. Breathing laboured. Continually getting up and down, and rolling from time to time. Tympany well marked. She had passed no fæces for thirty-six hours, nor passed any urine. I used the catheter and emptied the bladder of a quantity of coffee-coloured urine. I removed a small quantity of fæces from the rectum, and could feel other portions of intestines distended with flatus. I gave a draught of ammon. carb., sodii bicarb. and nux vomica.

2 p.m.—Tympany considerably less. Still in very acute pain; standing up and sweating profusely. No fæces passed and rectum empty. Pulse 72 and very feeble. Heart sounds could not be heard. The mare was constantly straining and pushing her head against the

manger. I then gave her a diffusible stimulant. At 3.30 p.m. she dropped dead.

Post mortem at 6.30 p.m.—Bowels enormously distended with gas. There was a well-marked twist at the pelvic flexure of the colon.

On removing the bowels I found a large diaphragmatic hernia through which a large portion of the colon had passed, and also a portion of the small intestines, which was torn from the mesentery.

On opening the intestines I found the whole of the double colon filled with ingesta, and that portion in apposition to the abdominal floor impacted with a mass of sand and gravel. There was also a lot of this in the cæcum. The amount of foreign materials weighed about 15 lbs.

I washed this material free from the ingesta, and on close examination it was found to consist of sand, small particles of old red sandstone (a local stone) and various other particles, such as pieces of wood, bent pins, minute pieces of glass, fragments of galvanised wire netting, &c. The pieces of sandstone varied in size from that of a millet seed to that of a grain of maize.

I examined the corn she had been having and found it very clean. She had not been out to grass, so could not have got it there. The only solution I can arrive at is that it was in the moss litter. She was a very ravenous feeder, and was always throwing her food out of the manger on to the ground and picking it up again. It is possible that this foreign material was picked up at the same time.

BACTERIAL NECROSIS OF THE CARTILAGE OF THE LARYNX.

BY J. WILLETT, M.R.C.V.S., HARLEY PLACE, LONDON, W.

I WAS called on October 13 last to see a bay cart gelding, aged about twelve years, the property of a brewery company, and upon examination found the animal to be apparently suffering with a slight cold and sore throat; the temperature was 102°. The usual treatment was adopted, viz., local stimulants externally and electuary over the tongue, and in a few days the horse was back at work.

On November 1 I was again called in and diagnosed acute laryngitis, which gradually became worse towards night, necessitating tracheotomy being performed.

November 3.—An abscess burst in the throat with a copious discharge of purulent matter, and from that time there was a gradual improvement until November 15, when he became very dull, temperature 103°, and with the throat slightly swollen. These symptoms gradually became more severe until the 24th, when they were again relieved by the bursting of an abscess.

November 26.—The animal was noticed to be very lame on the near hind-leg, and on examination the muscles below the stifle were found to be swollen, hot, and painful to the touch. Fomentations and anodyne liniment were applied.

November 27.—The off hind-leg became involved, and on the following day both fore-legs were also affected. Acute muscular rheumatism was diagnosed, and treatment for this accordingly adopted. The patient evinced great pain. It was continually lying down for short intervals. These symptoms gradually abated, and on December 3 he seemed practically recovered.

December 9.—The patient was reported as not feeding, and the throat to be swelling. I found him very feverish, temperature 105°, and breathing with difficulty. A blister applied to the throat was followed by a certain amount of relief, but not being satisfied with the progress on December 12, I asked Professor Hobday to meet me in consultation. His opinion confirmed mine, viz., that we had some unusual and serious lesion of the throat accompanied by abscess formation to deal with.

December 14.—I cast the animal and examined the throat, hoping to find some foreign body, but beyond finding the pharynx much swollen, failed to discover any cause; the horse gradually improved after the abscess burst, and I was hoping that the trouble would not again appear.

January 1, 1907.—I was again called to see him, and found a recurrence of the symptoms to the throat with temperature 104°. By this time I had come to the conclusion that my case was hopeless, but I asked Professor Hobday to see him again with a view to operating on his throat if at all likely to be successful. His opinion was negative, and we advised that the animal should be destroyed.

Post-mortem examination revealed the larynx to be greatly swollen, with much œdema in the surrounding tissues, the cartilage on the right side showing a patch of necrosis.

The larynx was submitted to Sir John M'Fadyean, and his opinion was that the lesion was due to bacterial necrosis of the cartilages following an acute streptococcic infection.

VETERINARY HYGIENIC PRINCIPLES APPLICABLE TO STOCK IN SOUTH AFRICA.

BY DR. ARNOLD THEILER, GOVERNMENT VETERINARY BACTERIOLOGIST, AND C. E. GRAY, M.R.C.V.S., PRINCIPAL VETERINARY SURGEON.*

Foot and Mouth Disease.

Foot and mouth disease, which was so unduly prevalent in South Africa in 1893, is a disease of very wide geographical distribution, and was probably first introduced from India, where it appears to have existed from time immemorial. The disease is endemic in Asia, whence it has spread on numerous occasions to Europe, Great Britain, and even to the shores of North and South America. Of a highly contagious character, and caused by an ultra-visible organism which passes through the pores of a Chamberland filter, it is generally benign in type, although on certain occasions and under certain conditions it assumes a virulence which is as extreme as it is unusual. This is

* Abstract from the *Transvaal Agricultural Journal.*

most likely to occur in periods of drought, when there is a dearth of the succulent food so necessary during convalescence, and when circumstances compel stock-owners to keep infected animals moving about from one place to another, and, in this manner, depriving them of that rest which is indispensable for their recovery when foot lesions are present. The disease, which most commonly affects ruminants, is by no means confined to this class of animal, pigs, dogs, horses, fowls, and even man himself, being not infrequently attacked. In man, the disease is occasionally contracted through drinking milk drawn from cows suffering from udder lesions, and, in such cases, mouth eruptions with bad sore throat are common; characteristic vesicles sometimes appear on the hands, while fatal cases of diarrhœa have been known to occur in young children. The disease, which has a short period of incubation, spreads rapidly from animal to animal, the discharge from the vesicles, the saliva, milk, and evacuations from the bowels, are all media for the dissemination of infection.

The last outbreak of foot and mouth disease recorded in South Africa occurred in Rhodesia in 1903 amongst a shipment of camels, which were fed upon, and probably infected by, a supply of fodder imported specially from India for their consumption; at least there is no other conceivable manner in which the infection could have been conveyed to them, as no cases of foot and mouth disease are known to have occurred in Rhodesia for at least ten years previous to this outbreak, and veld infection could not have lasted so long, although it has been proved that virus retains its potency for a very long time in manure and in grass. In the case of this outbreak, the infected animals were promptly killed. A cordon was established around the infected area, and the disease spread no further, but at the present moment, although we are unaware of its presence in any particular area, we have no definite assurance that it no longer exists anywhere in South Africa, as it may be still lurking unsuspected in some of the native territories.

No special regulations have been drawn up for dealing with foot and mouth disease in any South African Colony save in the Transvaal, although in all other Colonies the regulations applicable to proclaimed diseases generally apply thereto, and provisions exist for putting special regulations into force should the disease make its appearance.

The Transvaal law deals very fully with foot and mouth disease, and gives the Government full power to kill off infected animals for the purpose of stamping out an outbreak, to restrict movements of human beings and animals within an infected area, to provide for the disinfection of milk by boiling, and specifies the period for which quarantine must be imposed, which, in this case, is placed at not less than fifteen days.

When the disease is known to be prevalent, stock-owners should keep a sharp look-out for suspicious symptoms amongst their animals, and any sign of irritation of the mouth or feet in any of the domestic animals should be carefully noted; in cattle, salivation, smacking of the lips and shaking of the feet are generally premonitory indications of an attack; and in sheep, in which mouth lesions are seldom so well marked as in cattle, the simultaneous occurrence of cases of lameness in a flock should always excite suspicion, particularly if these appear

at the same time as cases of sickness amongst cattle. Should the disease actually make its appearance, the stock-owner can only adopt palliative measures, allowing the disease to run its course, and hastening the spread of the disease in an infected herd, provided conditions are favourable, by rubbing the mouths of infected animals with a rag and then passing the rag through the mouths of those which are healthy. He should treat the local lesions by the application of antiseptics, should keep them well supplied with succulent food, should also be most particular about boiling any milk intended for human consumption, and should endeavour to keep natives and over-inquisitive neighbours away from the scene of the outbreak. In ordinary epidemics of this disease, the loss in former years has not been great, frequently amounting to less than 1 per cent., provided animals receive proper attention, and if foot lesions which may lead to abscesses and subsequent permanent lameness are carefully treated. But as the disease sometimes assumes malignant characters and may be attended by a mortality (and has recently, according to certain observers, shown a tendency to do so) which sometimes runs to 50 per cent., stock-owners cannot afford to regard the disorder as one unworthy of serious consideration, and as one which may, on that account, be allowed to spread with impunity.

Redwater or Texas Fever.

This is, unfortunately, one of those diseases in which ordinary legislative measures can avail us very little, unless these are directed towards the eradication of the tick responsible for spreading it, as redwater infection has now established itself so firmly in this colony, to a greater or less degree, that it is no longer possible to draw any hard and fast line between infected and uninfected areas, and even if we could do so, no measures short of the maintenance of a permanent embargo upon the movement of all cattle from infected into clean areas would check the further spread of the disease, because we know that animals which have recovered from the disease and which are, to all appearances, in perfect health, cannot enter a clean area in which ticks are present without infecting it indirectly through the agency of the ticks which attach themselves to their bodies, and that there is no likelihood of an area upon which such apparently healthy but infected cattle are running becoming safe for susceptible stock. For these reasons, no period of quarantine is imposed on farms in this colony upon which sporadic cases of redwater occasionally occur, as they are always likely to do when newly-imported cattle from localities in which redwater is unknown are brought into redwater-infected areas.

In this colony the mortality caused by redwater is comparatively small amongst native stock, because most of these contract the disease in a mild form when young, much as native children contract malaria in infancy in malarious districts, and, although not absolutely immune against the disease, they are not seriously incommoded when exposed to further infection. The resistance displayed by animals which have had redwater and which have recovered from it does not amount to an absolute immunity, but is rather a tolerance. This tolerance, due to the continual presence in the circulation of the parasite causing the

disease, generally lasts as long as the recovered animal is subjected to the influence of repeated attacks of infected ticks, but may be lost if it is removed from an infected area for any length of time, and the animal may again become susceptible, it being a matter of common knowledge that salted animals may and do die from acute redwater on returning to their native veld after a prolonged absence.

Although the presence of the organism of redwater in the blood of recovered animals does not seriously incommode them nor affect their general health so long as they are well cared for and are not exposed to adverse influences, their resistance may be overcome and they may develop symptoms of acute redwater if their vital powers are lowered by overwork, exposure to cold, to attacks of any other debilitating disease, or even if they are over-infected by the progeny of ticks which have dropped from the bodies of other animals suffering from acute attacks of redwater. An interesting case bearing out the correctness of the statement as to the possibility of over-infecting salted cattle by ticks, which may be mentioned here, is that of a farmer resident in the Eastern Province of the Cape Colony, whose cattle suffered very severely from redwater when this disease first invaded the colony. A small percentage only of his herd recovered from the disease, and although their progeny throve, the farmer found it impossible to bring clean cattle on to his farm for re-stocking purposes, as they invariably contracted redwater, and the loss was so great that, after making two or three attempts to introduce fresh blood into his herd, he gave up the idea as impracticable. After an interval of some years, during which no case of redwater was observed on the farm, the farmer was tempted to make another attempt to re-stock by the offer of a cheap lot of clean cattle in another district, which he purchased and took to his holding. Soon after the introduction of these animals redwater again appeared, and not only did the disease carry off the majority of the newcomers, but many of his original herd which had been bred on the place contracted the disease as well, the explanation of the phenomenon doubtless being that the farm had become so nearly clean by reason of the smallness of the number of cattle running on it, that his own cattle had only kept up the veld-infection to a slight degree, and being only slightly tolerant to the presence of the parasite in their blood, were unable to withstand the attacks of the large number of infected ticks hatched out from the eggs of these insects which had fallen from the bodies of the infected and highly susceptible newcomers.

Cases of acute redwater in salted animals have been observed to occur occasionally during the course of an epidemic of rinderpest in redwater areas, but they are more common in association with outbreaks of so-called Rhodesian redwater, and sometimes the symptoms of ordinary redwater are so pronounced that the existence of Rhodesian redwater may be overlooked unless a careful *post mortem* is undertaken and the blood is microscopically examined. For this reason, chiefly, ordinary redwater has been added to the list of diseases whose existence must be reported in order that the veterinary department may have an opportunity of determining whether reported cases are cases of simple redwater for which no quarantine need be imposed, as in Redwater areas, or whether Rhodesian redwater is

present as well, in which case measures must be promptly taken to prevent the spread of the disease; and farmers would do well to remember that they can give the authorities very material assistance in the work of checking Rhodesian redwater by reporting the occurrence of any case showing symptoms of ordinary redwater, not after the animal is dead and buried, as so many do, but while it is still sick, so that a definite conclusion as to the nature of the disease may be arrived at. In this colony little can be done by the individual stock-owner for the eradication of ordinary redwater. The only step which he can take in that direction is that of attempting to get rid of the tick responsible for the spread of redwater by dipping or spraying, a difficult if not an impossible task on account of the variety of animals by which the blue tick is carried; and if the individual were to succeed in freeing his farm completely from these insects, the benefit which he would derive would be problematical, unless his neighbours were also compelled to dip or spray their stock, because cattle raised on a tick-free farm in a redwater area could not be moved from it without running the risk of contracting the disease unless the owner took the precaution of inoculating them against redwater before their removal. These remarks, however, need not deter anyone resident in a district where ticks are so numerous as to cause actual loss and injury to his stock from attempting to reduce their numbers by systematic dipping or spraying, as he will discover that the number of ticks can be much reduced by these means with undoubted benefit to his animals. Other points that farmers living in a redwater district would do well to remember are that, if introduction of cattle from outside the area is contemplated, unless they come from a country where the disease is endemic, they cannot very well be brought into it too young, that they can be brought into it with less probable loss in winter time, when ticks are least abundant, and that the loss amongst such animals is much smaller if they are inoculated and allowed to recover from the effects of the inoculation before they are turned out on the veld than if they are allowed to run at once and take their chance of contracting the disease naturally. Native-born animals from clean areas are much less seriously affected by inoculation than susceptible imported animals from oversea, amongst which the death rate is often high, so that if the improvement of a herd in a redwater area by the introduction of an aged susceptible bull from oversea is contemplated, such an animal should not be allowed out to graze, but should be kept stabled, and only turned loose in a clean, tick-free kraal.

Rhodesian Redwater.

It is scarcely necessary to remind our readers that, of all the misfortunes which have befallen stock-owners in this colony, the invasion of Rhodesian redwater is the greatest. Other diseases, it is true, have caused greater losses in a shorter space of time, but we have never before had to cope with a disease which is more difficult to shake off, of which we know but very little, and against which methods of inoculation and medical treatment have proved so unavailing. Originally a disease confined to the coastal districts of Africa, whence it has never before shown any disposition to spread, it has

followed the line of railway in all three routes which it has recently taken in invading the interior, *viâ* the Uganda, Beira and Delagoa Bay railways, and it is of interest to note that, in every instance, the special ticks by which the disease has been spread were in the country before its arrival.

Although there was never any doubt in the minds of veterinarians as to the manner in which the disease was spread, it was some time before identity of the responsible ticks was determined, and it was only after many elaborate and numerous unsuccessful experiments that the intermediary hosts were proved by investigators in Cape Colony and in the Transvaal to be chiefly the brown and the black-pitted ticks, although Koch maintained up to the day of his departure from South Africa, after devoting a year to the study and investigation of the disease, that the blue tick (*rhipicephalus decoloratus*) was the chief agent. Later researches have proved the fallacy of this and of many other views embodied by Dr. Koch in his successive reports on this disease, and when the method of inoculation recommended by him proved ineffective, after receiving a careful and extensive trial in the Victoria District of Mashonaland, it appeared to the various Administrations engaged in a struggle with the disease, that nothing could be done but to attempt to hold the disease in check by prohibiting movements of stock, in the hope that investigations might put them in possession of some more effective method of beating it back. This hope has now been realised to some extent, and when experiment showed that the disease-producing ticks did not transmit their pathogenic powers to their offspring, that recovered animals did not retain in their system the germ of the disease by which veld-infection might be kept up indefinitely, and that infected ticks could be starved out and infected veld could be rendered clean by keeping susceptible cattle off it for a period of fifteen months, the possibility of arresting and eradicating the disease became more apparent; and in the Transvaal stock-owners are beginning to realise that by fencing infected areas, by removing cattle therefrom, by slaughtering them when necessary, by branding cattle running on infected areas to check any illicit removal of such animals, and regulating movements of stock, the progress of the disease may be stayed and infected areas may be purified. The Transvaal Stock Regulations provide for the carrying out of these precautions, and although the contest with the disease may be somewhat prolonged, there is no doubt as to its ultimate outcome if it is persevered with, and when the disease is finally banished, the Transvaal will be in a better position to devote itself to stock raising than it has ever been before, inasmuch as the extensive fencing of farms will serve to check the spread of other diseases besides Rhodesian redwater.

In Natal, where the disease appeared at a somewhat later date than it did in this Colony and in Rhodesia, and where a smaller area has been invaded, a somewhat different method of combating its spread has been adopted, the authorities making arrangements for the clearing of all cattle from zones around infected areas, and then removing the healthy cattle, after dipping or spraying, from the area in which the disease has appeared, through a series of temperature camps where they are kept under observation till the period of incuba-

tion of the disease has expired. Animals suffering from the disease within the infected area are destroyed, compensation being given to the amount of not more than £15 for any one animal, and any showing a rise of temperature while under observation are similarly dealt with, experience having shown that if an infected animal is killed directly a temperature rise is noticed, it does not perpetuate veld-infection. After this process of removal is completed, and the whole area has been freed from cattle, it is kept clear of these animals for about fifteen months, and may then be re-stocked with safety. It is obvious that measures like these followed in Natal can only be followed when the infected area is comparatively small, and when the authorities have a free hand and ample legal powers to deal with outbreaks, and in these respects the Natal Administration are fortunate.

Of all South African Colonies which have suffered through the invasion of this disease, Rhodesia has been the most unfortunate, inasmuch as the early date of its invasion at a time when the disease was unknown to science, the large area involved, the great number of cattle owned by natives, and the necessity which existed in certain localities for keeping mines supplied by ox transport, all contributed towards the spread of the disease, so that a large proportion of the cattle owned by Europeans were swept off, and native losses in some districts were also very heavy. By the reduction in the number of cattle, by the virulence of the disease, and by the imposition of severe restrictions which were loyally complied with by the majority of the European farming community at a cost which can only be appreciated by those who submitted to them, the disease has been checked, and is now being stamped out by the adoption of measures somewhat similar to those of Natal for the removal of the surviving cattle from the areas which are still infected.

In the Cape Colony and the Orange River Colony no special regulations have been drawn up for dealing with the disease except those framed for the exclusion of cattle, grass, hay, and hides from those colonies in which the disease exists, and for the dipping of sheep coming therefrom to prevent the possibility of infected ticks being introduced in their wool.

Anthrax.

Anthrax or melt sickness, like foot and mouth disease, does not confine its ravages to any one class of animals, horses, mules, cattle, sheep, pigs, and even man himself, being all susceptible; but, unlike foot and mouth disease, the mortality amongst infected animals is extreme. It has not at any time shown any tendency to become epidemic in this Colony, but is more or less local in character, certain areas having an evil reputation amongst stock-owners. Practically unknown in some parts of Africa, cases being very rare in Rhodesia, it is particularly prevalent in the south-western districts of this Colony, where it causes very considerable loss at certain seasons of the year, there being little doubt that many cases of sudden death amongst sheep and cattle, which are attributed to vegetable poisoning, are due to this disease, and its presence should always be suspected, in localities where the disease is known to exist, when any animal is found dead which has shown no previous indications of illness.

The bacterial character of the disease was recognised over fifty years ago, when the bacillus of anthrax was first discovered by Pollender in the blood of animals suffering from the disease. Like certain other disease-producing organisms, the bacillus of anthrax possesses a very remarkable vitality, seems to be able to exist for a long time outside the animal body, and is not readily destroyed by extremes of heat or cold, so that the contamination of a pasture by the blood or excretions of an animal suffering from anthrax is likely to lead to the establishment of a centre of infection which may perpetuate the disease indefinitely unless measures are taken to prevent animals from grazing over the infected spot. The disease, which is spread by animals grazing over infected ground, by drinking contaminated water, or by the bites of infected flies, runs a very rapid course, and its short incubative period renders the imposition of any lengthy period of quarantine undesirable, so that legislative measures are directed chiefly to prescribing the steps to be taken for disposing of the carcases of infected animals. None of the Colonial Stock Regulations,[1] save those of the Transvaal, indicate what special measures shall be taken for dealing with the carcases of animals dying of anthrax, but the matter is left to the discretion of the authorities in whose hands the administration of the general stock regulations is placed, which is somewhat unfortunate, as there is invariably a considerable diversity of opinion amongst laymen as to what constitute the most efficient and satisfactory steps to take for disposing of anthrax carcases, and the disinfection of the place where the body has lain.

The Transvaal Regulations direct that the carcases of animals dying of anthrax shall be burned or buried intact, the latter precaution being particularly desirable when burning is impracticable, because the organism of anthrax does not form spores unless exposed to the air, and if spores are not formed, the process of putrefaction which goes on when a carcase is buried intact is likely to destroy the bacillus and the burial place will not become a centre for the further spread of infection. In addition to directing the burning or burial of the carcase, the Transvaal law also prohibits the bleeding of any animal supposed to be suffering from anthrax by anyone save a veterinary surgeon, and provides that the excreta discharges of infected animals and litter contaminated by these shall be burned or buried, and for the disinfection of the place where the animal has lain.

Although anthrax has never shown any tendency to become epidemic or to spread rapidly in this colony, stock-owners should remember that the persistent manner in which the disease clings to particular localities is a proof that conditions exist in this colony which are favourable for the propagation of the disease, and if cattle owners do not properly observe the precautions which ought to be taken in disposing of anthrax carcases, the infected area must inevitably extend, and the disease may ultimately become so common that it will be a source of serious loss, and may even assume epidemic characters under congenial climatic conditions, as it frequently does in other countries, and may cause great loss of life not only amongst animals but amongst human beings as well. Familiarity often breeds contempt, but stock-owners should bear in mind that they cannot afford to treat

cases of anthrax with contempt, as they are only too prone to do in localities where the disease is well known. Such conduct is criminal, and it behoves every farmer in those districts, both for his own sake and that of his neighbours, to comply carefully with the stock regulations and to regard with suspicion the body of any animal which has died suddenly. Too much care cannot be taken in disposing of doubtful carcases; no attempt should be made to skin such animals, nor should natives be allowed to use the meat, and if the bodies can be burned this should be done thoroughly. If not, a place should be selected for their burial where there is no likelihood of contaminating a water supply, and if quicklime can be obtained, a bucket or two of this should be thrown into the grave. The grave should afterwards be fenced to prevent animals grazing over it, and all contaminated litter should be carefully burned. After disposing of the carcase, the hands should be thoroughly disinfected, and should any suspicious sore afterwards make its appearance on the hands or arms, a medical man should be consulted at once, as a fatal attack of the disease may supervene.

Various methods of inoculation against anthrax have been introduced, the vaccine most widely used being that of the Institute Pasteur, but its use is open to certain objections, the period of immunity established being little over a year, and as the vaccine consists of attenuated cultures of the bacillus which induce a modified attack of the disease, its employment naturally tends to keep up the local infection. For the latter reason, Sir John M'Fadyean, after careful enquiry, came to the conclusion that it was not desirable to introduce the system into England. Recently, another method of inoculation has been introduced by Solenheim, who induces an active immunity by the simultaneous injection of serum and a pure culture of the anthrax bacillus. This method has been tested on a large scale in the Argentine Republic and appears to have given satisfaction, but its use is open to the same objection raised against the Pasteur vaccine, and, in this Colony, careful observations of the regulations will probably give more satisfactory results.

Glanders and Farcy.

Glanders and farcy are forms applied to two types of an equine disease caused by injection with the bacillus mallei. Both forms of the disease are widely distributed and fairly prevalent in South Africa, particularly since the war, the word farcy being used to describe cases in which the local lesions make their appearance superficially, while in glanders the lungs and respiratory passages are chiefly affected. Glanders and farcy owe their importance to the fact that they are highly contagious, are incurable, and are communicable to human beings with fatal results; and for these reasons they attracted the early attention of legislators, regulations of a more or less thorough character having been drawn up for dealing with them in all British South African Colonies. In nearly all colonies, however, the regulations have erred on the side of leniency, and give insufficient powers to the authorities, with the result that while they are able to hold the disease in check, they have only been successful in stamping it out in Rhodesia, although the position of Natal as regards the

prevalence of glanders and farcy is rapidly improving, and there seems every likelihood that Natal will be the next colony to become clean, thanks to an enlightened legislation. The pathology of glanders has been made the subject of most careful observations, the particulars of the disease have been placed on record, and science has now placed within our reach means whereby we can get rid of the disease with ease, if those in authority could only be brought to appreciate the importance of doing so. In former days, the most insuperable difficulty which stood in the way of those desiring to stamp out the disease, lay in the fact that when the disease made its appearance in a stable, no matter how thoroughly the place was disinfected, cases of the disease continued to make their appearance weeks and months after steps had been taken to cleanse the premises, and the occasional occurrence of cases in animals which had apparently been in good health and practically isolated from all other equines for months, inspired a belief that the disease might originate spontaneously. We now know that this conclusion was erroneous, and that these phenomena are due to the fact that animals may be infected and that microscopic glanders lesions may be present in their lungs while they remain to all appearances in the best of health for months after coming in contact with an infected animal. We also know that, in certain cases of this class, the disease may become arrested, and that the animals may, and do, succeed in throwing off the infection, although the majority sooner or later develop clinical lesions of this disease and die from its effects. The difficulty formerly experienced in detecting the existance of latent glanders in apparently healthy animals has now been overcome by the discovery and use of mallein. This preparation, which is made by the sterilisation and filtration of cultures of the bacillus mallei, causes no disturbance when introduced in small quantities under the skin of a healthy horse, but if a similar quantity is injected subcutaneously into an infected but apparently healthy animal, in which the disease is latent, it produces a very characteristic local reaction which is accompanied by a marked rise of temperature and frequently by very pronounced constitutional disturbance, enabling the experienced observer to decide in most instances, by the application of a single test, whether an animal is or is not infected with glanders. Armed with mallein, the problem of stamping out glanders becomes very easy of accomplishment, and the success accompanying a campaign against glanders depends upon the legal power conferred upon the authorities, and upon the inducement held out to persuade owners of animals to co-operate with them.

In Cape Colony, where the disease is perhaps more prevalent than elsewhere in South Africa, although the authorities have ample power to deal with infected imported animals or imported animals giving a positive reaction when tested with mallein, and have full power to test all imported equines, their powers to deal with outbreaks of glanders and farcy within the colony itself are sadly restricted, no provision being made for the compulsory testing of in-contact animals if the owner raises any objection. All that they can do if the owner declines to allow his animals to be treated, is to quarantine the premises upon which the disease has appeared until such time as the owner gives way and agrees to carry out the instructions of the department, and even

then, before a reacting animal can be destroyed, its destruction must be ordered by the usual board, which can rarely be got to appreciate the necessity for destroying a reacting animal which appears to be in good health. With such antiquated and inadequate machinery for dealing with this disease, it is little wonder that glanders is still prevalent in Cape Colony, and that deaths occasionally occur amongst human beings; nor is the position likely to improve, and it is a reflection upon the foresight of legislators that no steps have been taken to lighten the labours of a veterinary department which is capable and energetic, and which fully realises the importance of stamping out this disease.

In the Orange River Colony the law is somewhat more up to date, and gives full powers to members of the Government Veterinary Department to enter premises and examine animals, and, if satisfied that an animal is infected, they may order its immediate destruction. It also prohibits the movement by road or rail and the sale of infected animals, and provides penalties for neglecting to disinfect stables, and, generally, for any failure to comply with the instructions of the veterinary department, while it directs that private veterinary practitioners must report the occurrence of any suspicious cases to the Government Veterinary Department. The law, however, is capable of improvement in several important respects, as it only empowers the veterinary surgeon to test animals with mallein which are, in his opinion, infected with glanders, a somewhat absurd limitation, as it would appear to debar the authorities from testing animals which are in apparent good health if the owner withholds his consent, a disadvantage which is not overcome by giving the Chief Veterinary Surgeon power to direct the isolation of any animal which he is satisfied has been in contact with an animal infected with glanders for such period and under such restrictions as he may deem necessary. Seeing the application of the mallein test is an operation devoid of any danger to a horse in perfect health, and seeing that its application affords the only certain means of determining whether an apparently healthy animal is or is not infected with glanders, it is difficult to understand why a Government veterinary surgeon should be prevented from availing himself of the assistance which he would derive from being empowered to apply the mallein test to other animals besides those which show symptoms which lead him to believe they are infected with glanders. Another clause which may be reasonably taken exception to is that providing for the opening and examination of the carcase of any animal destroyed for glanders before the veterinary surgeon and two or more disinterested persons when the correctness of the diagnosis of the veterinary surgeon is disputed by the owner, the decision as to whether the animal is, or is not, infected with the disease being apparently settled by a majority vote, a method of arbitration which places the veterinary surgeon at a very serious disadvantage, as the "two or more disinterested persons" may not only be disinterested and well meaning, but totally incompetent to decide what constitutes a glanders lesion, and the veterinary surgeon's verdict may be undeservedly discredited. The section is further saddled with a proviso to the effect that compensation can only be claimed when a healthy horse has been destroyed in error, if the animal has been more than six months in the

country. This would appear to relieve a veterinary surgeon from any responsibility if he should condemn and destroy a recently-imported healthy animal, which is as unfair to an importer as the first part of the clause is to the Government Veterinary Surgeon.

In Rhodesia, the regulations for dealing with glanders are more thorough in every way than those of the Orange River Colony, and give the Government Veterinary Department ample freedom of action, as a Government inspector or a sub-inspector has full power to enter premises to examine and test animals which he considers should be tested. Any animal found infected with glanders, or which, in the opinion of the inspector, is liable to develop glanders, may be dealt with by the inspector or sub-inspector as he thinks fit, no compensation being recoverable for any animal condemned or ordered to be destroyed. The law also holds horse owners responsible for the thorough disinfection of their premises and of any harness or other furniture which may have been in contact with an infected animal. All equines entering the colony by road or rail are tested with mallein by an inspector or sub-inspector, and are only released if they pass the test in a satisfactory manner. In addition to taking these precautions, systematic tours of inspection of all stables and equines are undertaken by inspectors or sub-inspectors, and by careful observance of these measures the colony has been freed from this disease, and is likely to remain so.

The Transvaal law is practically identical with that of Rhodesia, but greater difficulty is experienced in carrying it out on account of the larger size of the towns, the large number of equines in the colony, and the amount of to and fro traffic with equines which is kept up between this and the adjoining colonies. Efforts are being made to make the best possible use of the existing regulations. All imported equines coming into this colony, except racehorses in training and animals engaged in *bona-fide* to and fro movement between colonies, must either be accompanied by a qualified veterinary surgeon, or they are tested at the port of entry by an inspector. Animals used for intercolonial transport work are allowed to enter under permit renewable at two months intervals, after a veterinary examination, and a staff of Stock inspectors is now engaged on a stable-to-stable inspection of equines in and around Johannesburg for the purpose of locating outbreaks of disease. Experience has shown, however, that there is one thing lacking in the regulations which militates seriously against the success of the work which is being carried out, and that is the absence of any inducement to lead horse owners to report the existence of doubtful or suspicious cases. In a colony like Rhodesia, where the total number of equines is comparatively small, if public support were lacking, which it is not, as the public there appreciate and support the policy of the Department, it would still be possible to eradicate the disease by a regular and systematic examination of all eqaines; but in the Transvaal the large number of animals to be dealt with precludes the possibility of doing this without engaging an army of inspectors. Not only does the law hold out no inducement to owners to report, but, as the regulations now stand, we actually penalise owners who are public-spirited enough to apprise the authorities of outbreaks, because when an outbreak is reported the Government Veterinary Surgeon examines the suspected

animal, tests it if necessary, and if he decides that it is infected it is destroyed forthwith, and he then proceeds to test all in-contacts. Amongst the in-contacts there is always some likelihood that one or more animals will react as infected, although they are to all appearances in good health, and as the working of reacting animals or keeping them in a stable with healthy horses is always attended by a certain amount of risk, as such animals may at any time develop a slight nasal discharge which may escape observation, but which may serve as a medium for communicating the disease to healthy animals, the owner is generally, but not always, given the alternative of having the animal destroyed immediately or of isolating it and holding it over for another test three weeks later. As, however, the owner almost always clings to the hope that there may be some mistake about the first test, or that the animal may cease to react and may be liberated later, particularly if the animal appears to be healthy, he almost always elects to isolate the animal, and, if it reacts a second time as infected, he probably makes up his mind to wait again, particularly if the reaction is less the second time than it was the first; and so he goes on waiting week after week for the liberation of an animal which probably, in the long run, develops clinical symptoms and has to be destroyed. After an expensive experience of this sort, it is not to be wondered at if the owner decides to refrain from reporting to the authorities next time he finds a case in his stable, and either kills the infected animal and sells off his whole stock and purchases others, or disposes of doubtful animals; his chance of detection, he argues, is small, and his ultimate loss is less than if he reports to the veterinary department; but the result, of course, is that a number of infected but apparently healthy animals are distributed all over the place, and fresh centres are established for the further spread of the disease. In this respect the present Transvaal regulations do not operate satisfactorily; the department are seriously handicapped in their struggle with the disease through lack of co-operation on the part of horse owners, and if the struggle has to be maintained under present conditions, it will be unduly prolonged and the ultimate cost of operations will be greatly increased.

What is urgently necessary for the better working of the regulations in this Colony is the introduction of a compensation clause somewhat similar to that contained in the Natal Law, which is quite as up to date as that of the Transvaal and of Rhodesia, but is superior to both in this respect.

In Natal the following clause is embodied in the regulations:—

"In the event of any animal being destroyed by order of a veterinary surgeon as being infected with glanders, the owner may claim to have the carcase opened and examined in presence of the veterinary surgeon and two or more disinterested persons. If the animal is found to have been infected with glanders, and the disease had openly manifested itself at the time of the inspection by the veterinary surgeon, then no compensation shall be claimable for the destruction of such animal. If the animal was so infected, but the disease did not become manifest until shown by a test applied by the veterinary surgeon, then compensation shall be paid out of the general revenue to the extent of two-thirds of the value of such animal. Provided that such compensation shall in no case exceed twenty pounds sterling.

If the animal be proved not to have been infected with glanders, then the compensation shall be the value of the animal immediately before it was slaughtered, but shall in no case exceed thirty pounds sterling. The value of the animal so destroyed, for which it is intended to claim compensation, shall be decided by two disinterested persons, one of whom shall be appointed by the veterinary surgeon and one by the owner."

The Principal Veterinary Surgeon, Natal, who reports most favourably upon the operation of this regulation, has kindly supplied the following return showing the outlay incurred in compensating for visibly healthy but infected animals destroyed on account of their having reacted to the Mallein test:—

Period	Horses, &c., destroyed, Clinical cases	Reactions to mallein	Total	Compensation paid
July 1, 1898, to June 30, 1899 ...	20	49	69	£782 10 0
1899-1900	5	14	19	200 6 8
1900-1901	25	61	86	925 16 8
1901-1902	6	23	29	342 10 0
1902-1903	8	24	32	352 0 0
1903-1904	95	138	233	1,231 13 4
1904-1905	57	42	99	652 6 8
July 1, 1905, to December 31, 1905	16	24	40	150 0 0
Totals	232	375	607	£4,637 3 4

It is not the destruction of the visibly infected animal without compensation that the owner objects to so much, but he not unnaturally feels that he is being hardly treated when visibly healthy horses are destroyed without compensation or are kept in quarantine till they eat their heads off, in the hope, which is so seldom realised, that they will cease to react; and if arrangements were made whereby the Government would share the loss sustained in killing off all reacting animals at once and closing the outbreak, it is certain that most men would lose no time in reporting doubtful cases, knowing that the sooner the case is reported the smaller will be the likelihood of many of the apparently healthy animals being infected, and the total loss will be diminished; and in actual practice this has proved to be the case in Natal.

In dealing with outbreaks of glanders, horseowners should never forget that the disease is communicable to man, and that it is invariably fatal. For that reason suspected animals should be handled with the most scrupulous care, and persons with any wounds or abrasions on their hands or elsewhere should not be allowed access to such animals, nor should they be allowed to handle anything which may have been contaminated by any discharge from an infected horse. Doubtful cases should be reported to the authorities at once, the sooner the better, and the man who knowingly disposes of an infected horse, or conceals the existence of the disease, should be severely dealt with.

NOTES ON EXPERIMENTAL REDWATER INOCULATIONS.*

By G. A. Maynard, F.R.C.V.S.

A herd of shorthorn cattle, 148 in all, consisting of 88 cows and 60 calves, were moved from Mr. R. H. Struben's farm of Tafelberg, Cape Colony, to the Pyramids, Pretoria, and I may here emphasise the fact that Redwater has never been known on Tafelberg, whereas it is very prevalent on the Pyramids. And as all the cattle brought up had been born on Tafelberg, and never been off it, we may fairly assume we were dealing with a susceptible herd, which, indeed, was proved by the results, and a few notes on the results of our experimental inoculations may be of interest to some of the readers of the Journal.

I may say that it was not without considerable thought and consideration, in which we were much helped by the kind and valuable advice of Messrs. Gray and Macdonald, that we finally decided to commence our inoculations on six animals and see what the result would be before undertaking a larger number. From the information to be obtained from the literature on this subject, no very definite result could be expected, some experimenters having a death rate of less than 2 per cent., and others as high as 33 per cent., and to add to the confusion, no reliable statistics as to the probable death rate from tick infections could be obtained.

One great source of error appears in most papers on this subject, both those published in this country and Australia, and that is, no care seems to have been taken to ascertain that inoculated animals were not already immune, and as the experiments have been carried out on infected ground, the probability is that many were so, and, therefore, the results quoted are, or may be, very misleading, and, at any rate, cannot be accepted as of much value. Another important point would seem to be the recording of the age of the animal; this also has been passed over, and so another possible source of the difference in results cannot be checked. It will be seen below how far from the usually accepted figures our results were, and also how soon some animals became naturally immune, showing, I think, that more details should be given in recording experiments for them to be of much comparative value.

The removal of the herd taking place in May, the beginning of the winter, there seemed no great hurry to commence inoculations, but, unfortunately, from one cause and another, when we eventually started, we were getting on in the season, and the last lot of inoculations were rather too late to give the best results in some respects, more particularly as so many of the cows had become naturally infected.

Owing to the generally accepted idea that calves, when attacked, develop the disease very mildly, we decided not to inoculate any calves, but, contrary to expectation, the death rate was very high, 20 per cent. A possible explanation of this disagreement between

* Abstract from the *Transvaal Agricultural Journal.*

our result and the usual one may be that in most cases the low death rate of calves only refers to those calves born on the infected area, and therefore one may assume the mothers to be or have been affected, and some immunity may be acquired through the placental circulation by the fœtus; and as one may suppose a more or less constant infection, a very mild attack would be developed as soon as the immunity had decreased sufficiently to allow of any reaction at all, in exactly the same way as, I suppose, the permanent immunity of the adult cow is kept up on an infected veld. That something of this sort happens is, I think, shown by the loss of immunity which, I understand, occurs in cattle taken off an infected veld.

On September 17 we started by inoculating six animals; three cows, aged 5 to 7, and three young oxen, aged about 3. These animals all developed the disease, and three cows had a morning and evening temperature chart kept, and two of them a nearly daily examination of the blood made, including a red-cell and leucocyte count. Two showed a typical reaction, and the third, although pyroplasma were found in its blood, developed no temperature reaction, and no symptoms except a slight loss of appetite on two days, thus showing how mild some reactions may be. All six recovered.

Encouraged by the good results obtained in the first experiment, we decided to inoculate thirty. This was done on October 15, after an examination of the blood had been made, so that we could exclude any that had become naturally infected, replacing those by non-infected animals. By this examination we found nine to have become naturally infected, and, of course, they were not subjected to inoculation. From this second batch, whose ages varied from 5 to 7, two died, although some others were very ill and required very careful nursing and feeding. One ox died after a long period of severe fever, but the other death was a cow that was found dead one morning, though up to the previous day it had shown no symptoms at all. All the remaining twenty-eight recovered after various degrees of illness.

During this period natural infection was going on fairly rapidly among the remainder, so that by November 15 there were only thirty-seven cows that had not, to our knowledge, had the disease. Blood smears were taken from all the thirty-seven, and only nine were found free from indications that they were or had recently been infected. These nine were then inoculated, and all recovered after a more or less severe reaction. The ages for nearly all the cows were from 5 to 7.

Having briefly sketched the history of the inoculation of forty-five animals, most of which, if not all, we may safely assume were not infected prior to the inoculation, and the death rate being 4·4 per cent., we may use it to compare with the results obtained from the naturally infected ones. Of course, the numbers dealt with are not nearly large enough to deduce any very valuable statistics from, but, as a comparison, they may be of value. It is here necessary to state that the inoculated cattle were not able to be treated differently from the rest of the herd, unless they showed symptoms of severe sickness, and the same treatment was accorded to any animal, whether inoculated or not, so that no difference in this respect exists. The death rate from non-

inoculated cattle worked out at 11·7 per cent., as against the 4·4 per cent. from the inoculated.

It may be objected that we made no provision for preventing the inoculated cattle from becoming naturally infected as well, and this is true, but it was impossible to house them, and they were not in a condition to stand the exhaustion of spraying without seriously prejudicing their chances of recovery; and we preferred to take the risk of any damage that might accrue from double infection, considering it highly doubtful that any ill effects would be produced, provided the natural infection was subsequent to the artificial one.

I am aware that some authors think differently, but on what grounds or on what analogy they assume this I do not know. I will not here go into the pathology of the disease, as I have already published some results of these experiments in that respect in the March number of the *Transvaal Medical Journal*, but before closing, I should like to make a few remarks on the treatment we found most useful. As general principles, it may be safely laid down that rest, protection from extremes of heat and cold, a good diet with a fair allowance of green food, and an abundance of water are essential.

As regards rest, the animals should not be driven, but allowed to wander at their own pace, and, if possible, feed as they go. They also should, if possible, be protected from the midday sun, and herded near water that they can drink. When any serious symptoms arise, the affected animal should be kept in the kraal or shed and supplied with plenty of green food, gruel and water.

As to the medicinal treatment, I may as well say at once that, as far as specific treatment goes, I know of none. I have tried quinine given by the mouth, hypodermically and intravenously, and also disodium methyl arseniate, but without any very brilliant results. Because one or two animals recover while receiving a certain treatment, we must be careful not to assume that it is necessarily because of such treatment; it may be in spite of it. At the onset of the disease, constipation is very frequent, and requires prompt treatment; one of the best is, I believe, 1 dram—a half-teaspoonful—of calomel tipped into the cow's month and rubbed into the saliva to prevent its being blown out. If this is not effective an enema should be given, and it is sometimes necessary to remove hard, dry masses of fæces from the rectum by hand. The giving of large doses of Epsom salts and their frequent repetition, so often advocated, I would strongly deprecate, on the grounds of its very depressing action on the heart, already much affected by the disease, and the great drain of fluid they produce from an already very impoverished blood; also they are unnecessary, as there appear to be aperients much more suited to the pathological condition. After attention to the bowels, the next symptom that calls for treatment is the weakness of the heart. This is, I think, the most frequent cause of death, and if the heart can be tided over its trouble for a few days, the animal will often recover. For this purpose we found no drug so useful as ammonium carbonate given in 2 to 5 dram doses twice or three times a day, not forgetting the evening dose before the cold of night. In addition to the ammonia, brandy may be given in very bad cases, but the expense of doing this as a routine practice is necessarily very high. It was also our practice to give a dram of quinine sulphate with the ammonia. If this is done

the ammonia should be first dissolved in a very little warm water, and then the quinine dissolved in this; then when the bottle is filled with water the precipitate is not lumpy and does not stick to the bottle, as it does if the quinine is added to a dilute solution of ammonia. Whether the quinine has any really beneficial action is difficult to determine on so small a number of cases, but my impression is that, although not a specific in the usual sense of the term, if given regularly for some time it does good.

Personal.

We most heartily congratulate Major Henry T. Pease, Principal of the Punjab Veterinary College, upon the new honour, that of "Companion of the Indian Empire" (C.I.E.), which has recently been conferred upon him. This is the first official recognition of the kind made by the Indian Government towards the scientific work done by the Civil Veterinary Department, and Major Pease is the third veterinary officer to whom this distinction has been awarded, the other two being the late Lieutenant-Colonel J. H. B. Hallen, who did such excellent work in connection with the Indian horse-breeding establishments, and Colonel Joshua A. Nunn, who at present holds the position of Principal Veterinary Officer to the Army in India.

Mr. J. A. Gilruth, M.R.C.V.S. the Chief Veterinary Adviser and Bacteriologist to the New Zealand Government, is at present in Europe on a six months' leave of absence, and is spending the time in visiting the principal bacteriological and pathological laboratories in England, France and Germany.

The Pasteur Institute has recently benefited to the extent of about £1,000,000 by the will of M. Daniel Osiris, and it is estimated that an additional £30,000 or £40,000 per annum will be able to be spent in research work in the French colonies; a large proportion of this will be allotted to diseases which affect animals.

Newcastle-on-Tyne has now taken its place in the front rank of those cities whose hygienic arrangements for the benefit of their citizens consider the presence of a veterinary official an advantage, and, indeed, a necessity. The competition for the position was exceptionally keen, even although the Authorities at first insisted upon an additional sanitary qualification (either the diploma of the Liverpool, or the Victoria, University, or the certificate of the Sanitary Institute) in addition to the diploma of the Royal College of Veterinary Surgeons. Mr. Thomas Parker, F.R.C.V.S., of Morpeth, was the successful candidate, and will take up his duties almost immediately. Mr. Parker graduated at the Royal Veterinary College, London, in 1900, saw service as civilian veterinary officer in South Africa during the Boer war, and finally settled down to private practice in the north of England. Mr. Parker had several years, practical experience in abattoir work before entering college, and, whilst in London, obtained the first-prize silver medal of the College Medical Association for a thesis on "Meat Inspection." Although not possessing either of the extra certificates above alluded to, he had

wisely taken advantage of his opportunity to study for, and obtain, the Fellowship Diploma, and as this examination includes "Hygiene and Sanitary Science," it may fairly be contested that a present-day graduate who takes up his Fellowship Degree within a reasonable period after obtaining the M.R.C.V.S. Diploma, holds the primary right to be considered as the best and most suitable professional man to control all sanitary and hygienic positions connected with animals, alive or dead.

Amongst the recent list of newly-elected Members of the Royal Sanitary Institute are the names of Major Meredith, F.R.C.V.S., Veterinary Officer to the First Life Guards and one of the Examiners in Hygiene to the Royal College of Veterinary Surgeons, and Mr. James A. Dixon, M.R.C.V.S., Veterinary Officer of Health to the Corporation of Leeds.

The motor car has lately been responsible for at least two serious accidents to well known members of the profession.

Major Pease, whose selection for the Companionsnip of the Indian Empire we have just alluded to above, was riding, at a speed of about twenty miles an hour, in a motor car belonging to Mr. Arthur Grey, a barrister, when suddenly a crowd of pariah dogs emerged from the hedge and crowded on to the road. The brakes were suddenly applied, but several of the dogs got mixed up with the wheels, and the car swung violently round, throwing Major Pease and Mr. Grey violently out. Both were seriously injured, Major Pease sustaining a fractured thigh and numerous contusions which necessitated his removal to hospital, where he is progressing towards recovery as satisfactorily as can be expected.

Nearer home, Mr. Albert Wheatley, F.R.C.V.S., the well-known veterinary surgeon of Reading, whilst driving his own motor car, met with a serious accident whilst trying to avoid collision with a horse and trap which was emerging from a by-road. The wheel of his car collided violently with the edge of the pavement and the car was overturned, Mr. Wheatley being seriously injured. The latest report states that he is recovering, although, of course, still confined to his room. Members of the profession will wish each of them a speedy recovery, and trust that they will feel no permanent ill effects of their respective accidents.

THE FOURTEENTH INTERNATIONAL CONGRESS FOR HYGIENE AND DEMOGRAPHY, BERLIN, SEPTEMBER 23rd to 29th, 1907.

Under the Patronage of His Majesty the Emperor of Germany.

The Fourteenth International Congress of Hygiene and Demography is to be held in Berlin, from September 23rd to 29th, 1907. The subjects for discussion of the different sections are definitely fixed, and the essayists have been selected. Numerous questions relating to the hygiene of men and animals will be dealt with.

All information referring to the Congress can be obtained at the Office of the Congress, Berlin 9 W., Eichhornstr. 9, or from the Secretary, Dr. Neitner.

Reviews.

THE KENNEL ENCYCLOPÆDIA. Part I., Vol. II. Edited by J. SIDNEY TURNER, M.R.C.S., F.L.S., F.Z.S., and VALE NICHOLAS. Published by the Encyclopædic Press, 22, Bank Street, Sheffield. Price 5s.

THIS book, as its title indicates, is intended to supply a want which has long been felt by all people, professional and lay alike, connected with the canine world, and if the first volume can be taken as a criterion of what is to follow, the success of the whole edition is assured.

It is intended that the work shall be published in parts, four parts to form a volume, and it is estimated that the whole work will comprise four volumes. To those who were enterprising enough to become subscribers some months ago, the price was reduced by one half, and it may truly be said that they have thereby obtained a bargain, for if the original intentions of the Editors are carried out, there will be very little of interest to dog owners which will not be touched upon. The only fault, if any can be found, is that of all Encyclopædic works, in that the space allotted to each heading must necessarily be limited, but this really is to some extent an advantage, as in these busy times it will prove an invaluable book of reference for the man who merely wishes to obtain a general knowledge without attempting to pose as a specialist; and in this it may safely be said that the Kennel Encyclopædia supplies a want which has for a long time been felt by the large majority of dog lovers.

The various subject headings are all treated by specialists, and the aid of the best known and most expert of all the breeding and showing world have been called in to describe their pet fancies. Mr. Holland Buckley describes the points of an Airedale terrier, Major Richardson writes a very interesting article upon the value of dogs for ambulance service, whilst Mr. Caxton Smith and Mr. Pocock deal with the dog in ancient times and his ancestry. Legal and purely kennel subjects are dealt with by the Editors, and a number of first and emergency treatments in disease are supplied by members of the veterinary profession.

In regard to the latter, keeping in mind the fact that the book is to be read by a large number of the general public, we trust that the veterinary writers will act up to the traditions of all true-minded professional men in their dealings towards one another, and merely write on general lines, or in detail only for specific emergencies where delay might mean loss of valuable life, avoiding the giving away broadcast of prescriptions which can only do harm all round—to the writer because they bring him in direct antagonism with his brother practitioners, to the client because they lead him to attempt that little amateur doctoring which is usually based on a very incorrect and inexperienced diagnosis, and to the patient because a dangerous delay is often caused, and the disease allowed to gain a much firmer grip than would be possible if only it had been combated by a skilled professional diagnosis and proper treatment at its early onset.

On page 104, as a footnote, we observe a most curiously inaccurate statement, palpably not worded by a veterinary surgeon, which we think should not pass unchallenged in these present-day methods of up-to-

date chloroform administration. The paragraph, signed by the General Editor, reads as follows:—"It is very important to know that dogs (unlike human beings in this respect) very frequently continue to make a crying noise when fully under the influence of the anæsthetic; the anæsthetic should not be pushed too far on this account, but judgment should be formed as to anæsthesia being complete by relaxation of the limbs, insensitiveness of the conjunctivæ, &c."

It is evident that if the opinion is based upon personal observation, the dogs which have been supposed to be under chloroform and still gave vent to a "crying noise," were not really anæsthetised at all, and certainly we venture to state that no modern veterinary surgeon would care to stand sponsor to such a statement.

SURGICAL THERAPEUTICS OF DOMESTIC ANIMALS. By Professor CADIOT and M. ALMY. Translated by Professor Liautard, M.D., V.M. Pp. 580 + xv., with 118 illustrations. Demy 8vo. Price 20s. net.

THE names of the joint authors, Professor Cadiot and his able colleague M. Almy, are almost as well known in England and America as in France, and Professor Liautard has again rendered signal service to English speaking veterinarians by the care with which he has carried out his share of the work.

It is the age of the specialist, and even in veterinary literature this tendency to divide book titles into more detailed headings, instead of an impossible endeavour to include the whole of medicine or surgery into one large volume, is becoming more and more marked.

Under the heading of "Surgical Therapeutics," the authors have compressed into as small a space as possible a volume of information which cannot but be of the utmost possible value to every practitioner.

Commencing with chapters on the various methods of restraint, and the administration of anæsthetics, the reader is gradually led through concise descriptions of most of the surgical diseases to which animals are subject, more particular attention being paid to operative treatment upon the horse than to that of other domesticated patients. If any fault can at all be found with the book it is that the descriptions are somewhat too brief, but as it is evidently intended for the busy practitioner, and not for the student who is preparing for examinations, this may perhaps be considered by some to be an advantage rather than otherwise.

The printing and binding of the book are in first class style, but the index contains numerous errors of reference which will probably be altered in another edition.

Report.

SECOND INTERIM REPORT OF THE ROYAL COMMISSION ON HUMAN AND ANIMAL TUBERCULOSIS.*

JUST as we are going to press we have received the above report, which includes the conclusions already arrived at by the Royal Commission, and details of a large number of experiments made in arriving at these conclusions. At present we will confine ourselves to quoting in full the summary of their conclusions, and reserving our comments for a future number.

"There can be no doubt but that in a certain number of cases the tuberculosis occurring in the human subject, especially in children, is the direct result of the introduction into the human body of the bacillus of bovine tuberculosis; and there also can be no doubt that in the majority at least of these cases the bacillus is introduced through cows' milk. Cows' milk containing bovine tubercle bacilli is clearly a cause of tuberculosis, and of fatal tuberculosis, in man.

"Of the sixty cases of human tuberculosis investigated by us, fourteen of the viruses belonged to Group I., that is to say, contained the bovine bacillus. If, instead of taking all these sixty cases, we confine ourselves to cases of tuberculosis in which the bacilli were apparently introduced into the body by way of the alimentary canal, the proportion of Group I. becomes very much larger. Of the total sixty cases investigated by us, twenty-eight possessed clinical histories indicating that in them the bacillus was introduced through the alimentary canal. Of these thirteen belong to Group I. Of the nine cases in which cervical glands were studied by us, three, and of the nineteen cases in which the lesions of abdominal tuberculosis were studied by us, ten belong to Group I.

"These facts indicate that a very large proportion of tuberculosis contracted by ingestion is due to tubercle bacilli of bovine source.

"A very considerable amount of disease and loss of life, especially among the young, must be attributed to the consumption of cows' milk containing tubercle bacilli. The presence of tubercle bacilli in cows' milk can be detected, though with some difficulty, if the proper means be adopted, and such milk ought never to be used as food. There is far less difficulty in recognising clinically that a cow is distinctly suffering from tuberculosis, in which case she may be yielding tuberculous milk. The milk coming from such a cow ought not to form part of human food, and, indeed, ought not to be used as food at all.

"Our results clearly point to the necessity of measures, more stringent than those at present enforced, being taken to prevent the sale or the consumption of such milk."

The report is signed by all the Commissioners, viz.: the late Sir Michael Foster, Professor G. Sims Woodhead, Dr. Sydney Martin, Sir John McFadyean, and Sir R. Boyce, and by the Secretary, Dr. Steegmann.

* London: Wyman and Sons, Fetter Lane; Edinburgh: Oliver and Boyd; Dublin: E. Ponsonby. Cd. 3322. Price 9½d.

Translations and Extracts.

CARPAL ARTHRITIS AND PERIARTHRITIS IN THE HORSE.

BY KRUGER.

THE author states that in the diagnosis of lameness the knee-joint is generally overlooked.

Solleysel mentions "osselets," and classifies them with splints, and Sirrel, Blaine and Hochstetter recognised exostoses of the knee. Havemann first drew the attention of practitioners to the fact that the articular surface of the small bones might be implicated without anything abnormal being seen externally. Strauss, Colemann and Gerlach denied that such a thing as knee-joint lameness existed. In 1845, Mr. Cherry classified the diseases of the knee. Rychner and Gurlt observed periostitis implicating the insertion of the anterior metacarpal extensor, and Möller and Frick first introduced the term "chronic arthritis," which has been frequently employed by Cadiot, Almy, Siedamgrotzky, Fröhner and Lanzillotti-Buonsanti. Drouin stated that the origin of periarthritis was in the insertion of the ligaments, and introduced the terms foundered knee (*genou coule*) and ringed knee (*genou cercle*). After describing the methods he adopted in his researches, the author discusses the relationship between carpal arthritis and spavin, and comes to the conclusion that they can all be classified as arthritis, periarthritis, or arthro-periarthritis. He, however, states that arthritis is more frequent (60 per cent.) than periarthritis (40 per cent.).

The diseased process commences in the substance of the bone and extends to the articular cartilage, and very often sections show that while the articulation is healthy there are patches of ecchymosis in the cancellated tissue of the bone. There are also softened patches that can be dug out with a needle, and they gradually extend to the cartilage, which is destroyed and eaten away, chiefly round the articular edges. Repair by eburnation or condensing osteitis is possible, unless the ulceration extends to the surface. When the cartilage is completely worn away the surface of the bone resembles a piece of worm-eaten wood or pumice-stone. In every case these lesions cause a depression on the articular cartilage, with a corresponding lesion on the opposite cartilage, although the diseased process extends from the surface to the interior of the bone, "which explains its symmetry," finally ending in anchylosis of the joint. The edges of the articular cartilage are the first to be attacked, the diseased process extending to the periostium and synovial membranes, and causing hyperostoses.

This is the usual way in which the development of the disease takes place, but in about 40 per cent. from mechanical causes the periostitis is of primitive fibrous osteophytes form, which can be easily cut and which ossify but slowly, their shape and structure being subject to great variation. The author considers that inflammation of the periarticular tissues is the origin of all allied diseased conditions of the joint, splints, periostitis, synovitis, and microscopically the bone tissue is rarefied from enlargement of the Haversian canals and absorption of the bone by the osteoclasts and giant cells, and this process extends in the direction of the least resistance, *i.e.*, the articular capsule. The three

forms can be differentiated, there may be fatty degeneration of the cartilage, which is riddled in numerous places, or this degeneration may be localised, and is only perforated in one spot; the islands of healthy cartilage are surrounded by inflammatory zones, which become detached and float about free in the capsule of the joint.

(*Archiv. für Wissenschaftliche und praktische Thierheilkunde.*)

ANTE-PARTUM HÆMORRHAGE IN A COW.

BY BIANCHEDI.

THE patient was about 6 years old, in exceedingly poor condition, and had been sold for a very low figure, because with her last two calves there had been profuse flooding, although the calves were strong and healthy. She was about eight months in calf.

She was driven, after purchase, about 50 kilometres, and was bleeding profusely on arrival at her destination. Shortly afterwards she died.

Litigation arising, the author was called in to make a *post-mortem* examination, and found about a litre of blood in the uterus, about twenty of the cotyledons detached, and the others but very slightly adherent. Probably this was due to the general weak state of the animal, accentuated by fatigue and over-driving.

(*Clinica Veterinaria.*)

THE PERIOD OF TIME IN WHICH WIND SUCKING IS DEVELOPED.

BY KETTNER.

THIS is a point of considerable importance in warranty. In Germany the limit is fixed by law at fourteen days, which Gerlach considers is correct. Dickerhoff thinks the time is longer before the peculiar noise is perceptible. Fröhner declares that horses will learn the trick in a week, but the author quotes two cases where the time was much shorter :—

(1) The animal had received a bit injury to the frænum of the tongue, and had a bucket of water constantly left in front of him so as to enable him to wash his mouth out. On the fourth day the author found him catching hold of the edge of the bucket, and on the sixth heard the characteristic noise. The bucket was removed, but he continued to bite the edge of the manger, and became an inveterate crib-biter.

(2) The animal was put into a box on account of lameness. On the second day he was noticed to lick the rack and catch hold of the bars with his teeth. He stopped when racked up short, but recom-

menced when let loose. On the tenth day the noise was distinctly heard.

The author thinks that horses will develop this vice quicker if they have a sharp, prominent object to catch hold of.

(*L. Echo Vétérinaire.*)

CYSTOTOMY IN THE HORSE.

BY BALDONI.

THE author gives a series of observations on incision of the bladder in the horse.

Urethro-Cystotomy.—The operation is facilitated by the introduction of a sound into the urethra, which is preferable to Gerard's method of injecting the bladder full of water. An incision in the middle line of the raphe is preferable to an oblique one, which is liable to wound the arteries of the bulb.

The incision is made through the skin and aponeurosis over the ischiatic notch, the suspensory and retractor muscles are separated, and the urethra exposed. The edges of the wound are drawn apart with retractors, the urethra punctured on the sound with a bistoury, and the wound enlarged with a pair of scissors. The distance between the external edges of the wound and the neck of the bladder is from 66 to 120 millimetres, according to the size of the animal.

The neck of the bladder is incised with a herniotome, guided by the forefinger of the left hand, on the right if the animal is thrown on the left side, and on the left if he is on his back. The urine then escapes.

Baldoni measures the size of the neck of the bladder after incision by means of wooden balls, varying from 32 to 74 millimetres in diameter. Slight hæmorrhage is stopped by tampons, and the wound closes spontaneously. The catheter is left in position, and the author has found that the common practice of irrigating the bladder daily is useless. The wound heals, and incontinence of urine is not to be feared.

Subrectal Cystotomy.—This is performed between the rectum and the urethra, but has grave drawbacks, the chief being the danger of the urine infiltrating into the pelvic connective tissue, and the risk of injuring the peritoneum.

Recto-Cystotomy.—This is performed on the animal when down, but not under the influence of an anæsthetic. The floor of the rectum is divided by a probe-pointed bistoury passed into it from before backwards, and the neck of the bladder dilated. The wound in the rectum is closed with Michel's sutures. This process is not, however, recommended, as there is likelihood of considerable swelling in the pelvis.

Ante-pubic Cystotomy.—This operation is extremely dangerous, as the anterior portion of the bladder is covered by a serous membrane.

Pre-pubic Cystotomy.—This has been performed by Butterfield on the horse, the bladder being drawn out by the inguinal canal, as in the cryptorchid operation.

The author has carefully studied the process of healing in urethro-cystotomy. The fistula cicatrises in from ten to twelve days. The wound in the bladder closes by granulation at its edges.

(*Clinica Veterinaria.*)

HYPERTROPHIED THYMUS GLAND AS A CAUSE OF DYSTOKIA.

BY GASSE.

THE patient, a cow, had been showing labour pains for three hours. She lay down on her left side, but got up from time to time, straining violently. The calf, which was presented in the posterior position, was dead; eight men had been pulling at it, and the spine was broken across the loins. The obstruction to delivery turned out to be a tumour on the chest, that stretched out the shoulders and elbows, and extended up towards the head. The author removed the contents of the abdomen and thorax, but the ribs were broken, and interfered with the hand penetrating the latter cavity. An incision was made over the centre of the tumour, and its structure could be felt. It was formed of soft tissue, divided by septa of a pale pink colour, and was full of a milky-white fluid. Half a bucketful of the tissue and fluid was removed, the skin further incised, and the calf delivered without further difficulty.

The tumour had both the naked-eye and microscopic appearance of the thymus gland, the fœtus had a supplementary limb from the right shoulder and a malformation of the face similar to one on the mother.

(*Berliner Tierarztliche-Wochenschrift.*)

NOTES ON THE ALTERATIONS OF THE MUCOUS MEMBRANE OF THE STOMACH AND INTESTINES IN BOVINE STRONGYLOSIS.

BY DR. T. BLUNSCHY (EINSIEDEIN, SWITZERLAND.)

THE author publishes a paper illustrated with photographs of the lesions of the gastric and intestinal mucous membrane, and makes the following observations:—

(1) The parasites are only found in the abomasum and first portion of the small intestines.

(2) They penetrate into the folds and glands in the deep portion of the abomasum without disturbing the mucous membrane. They enlarge the canals of the glands, rolling themselves into a spiral form, and gave rise to œdema, which ends in the formation of tumours, that vary from the size of a pin's head to a millet seed, with an opening in the centre.

(3) The parasites cause destruction of tissue and an invasion of leucocytes.

(4) These lesions are healed by the formation of cicatricial tissue.

(5) In chronic cases there is induration of the interglandular tissue with destruction of the gland tissue proper. This is seen in half the cases examined.

(6) No tumours were ever seen in the pylorus.

(7) In the small intestine the lymphatic follicles and Peyer's patches were chiefly affected, but without the formation of tubercles. There were degeneration and destruction of the epithelium and lymphatic follicles.

(8) The parasites contained red blood globules, which proved that they live on the cells.

(9) The mucous membrane of the terminal portion of the intestine was undergoing degeneration and destruction of epithelium, which can be attributed to the toxin elaborated in the bodies of the dead worms.

(10) The disease is not the same as that described by Lignières, as there are no miliary intestinal abscesses or clinical complications, such as pleurisy, peritonitis, or arthritis.

(*Schw. Arch. für Tiernhk.*)

THE EXAMINATION OF MILK FROM SICK COWS.

BY C. J. KONING (BUSSUM).

THE author makes the following notes on the subject:—

(1) *Tuberculin Test.*—A reaction of 1·5° C. is sufficient to reject the cow for milking purposes. According to Nocard, an animal that reacts 1·5° C. should be pronounced tuberculous, and one that reacts 0·8° to 1·5° C. should be looked upon as suspicious.

(2) *Chemical Analysis.*—Hess, Shäffer and others have found that the quantity of solid matter diminishes, while the albumin increases, also the chlorides contained in the ashes.

(3) *Refractoscope.*—Valentin used this method in 1879, and found that the coefficient of the refraction of milk varied between 1·3500 and 1·3502. Shortly after Pepper discovered that the coefficient of refraction varied in healthy and diseased milk. Numerous experiments have been made by various observers regarding this statement, which the author thinks is without foundation.

(4) *Krioscope.*—This method is too complicated to be used by any one but an expert.

(5) *The Conductibility of Electricity.*—Schnorf has studied this plan, and has shown that samples of milk from cows suffering from mammitis have a much higher conductive power than normal samples.

(6) *Enzymetic Method.*—This plan has been invented by the author. In diseases of the mammary gland the milk is rich in diastase, and the author states that this fact is of commercial value in determining if the cow is suffering from mammitis or is newly calved.

(*Weekblad Voor Zuivel ereiding en Verteelt.*)

NOTES ON BOVINE PATHOLOGY.

BY FRANCOIS MARKIEL.

THE author gives some notes on the subject which he made during a recent tour in Switzerland, compiled from his observations at the veterinary schools of Zurich and Berne, and from various professional friends whom he met in the course of his travels.

The most common diseases he met with in Switzerland were those of the generative system, the udder and the feet. Amongst the diseases of the generative system the most prevalent was granular vaginitis, or colpitis granularis infectiosa, which in 1905 existed in twenty-one cantons, and was the chief cause of sterility and abortion. Various lines

of treatment have been tried, both internal, "such as purgatives and antiseptics," and local applications, most of the latter being powerful antiseptics that were non-irritant, not poisonous, cheap, and easily used. Amongst others are mentioned solutions of creolin 0·5 to 2 per cent., lysol 0·25 to 3 per cent., bacillol 1 to 3 per cent., kresapol 1 to 2 per cent., ichthyol of pyoktanin 2 to 2·5 per cent., borax, borate and nitrate of silver 4 per cent., protargol 2 per cent., ichthargon 1 per cent., corrosive sublimate ·1 per cent., sulphate of iron, itriol and acetate of lead 3 to 4 per cent., sulphate of copper $\frac{1}{2}$ to $\frac{1}{5}$ per cent., sulphate of zinc $\frac{1}{2}$ to 1 per cent. Corrosive sublimate, creolin and protargol appear to be most in favour.

Leucorrhœa is not uncommon. It is usually due to retention of the membranes or dystokia, which cause chronic inflammation of the uterus and vagina. The discharge is generally purulent, of a pale yellow, and without smell, although sometimes it is fœtid. As a rule, the general health is unaltered, unless the discharge becomes fœtid. Treatment is prolonged, consisting of uterine douches by a sound of 8 to 10 litres of a $\frac{1}{2}$ per cent. solution of lysol or therapogen daily for from six to eight days. As a rule medicine is not given, although tonics are sometimes of service; but the patient must be well fed. It is advisable to examine the ovaries by the rectum, to ascertain if they are cystic; if so, the cyst may be destroyed by pressure between the thumb and forefinger. This small operation causes violent contraction of the uterus.

In Switzerland, as in other countries, sterility causes great loss; the subjects are either nymphomaniacs, or they never come in season. In the latter case the cause is usually the persistence of the corpus luteum, which may be ruptured in the same manner as cysts are. The animal after the operation usually comes in season about the tenth or fourteenth day. The condition may recur, but this is not common, and it may do so at short intervals—three to six days—necessitating as many as seven operations. Should the condition depend on some uterine derangement this must be treated, not omitting examination of the ovaries.

If the condition is not due to any pathological condition aphrodisiacs are indicated, such as cantharides, &c., twice a day, and in the evening the cow is brought to the bull, to excite her: this treatment is continued till she comes in season.

Nymphomania is more common than the former condition, and is generally due to ovarian cysts, which can be destroyed in the manner described. If the lesions are situated in the structure of the ovary, it is recommended to exercise regular and strong pressure on these between the two hands, one inserted into the vagina, the other into the rectum. In cases of nymphomania from tuberculous ovary the animal is spayed either by the ligature or ecraseur.

Septic and purulent metritis are fairly common in Switzerland from retention of the placenta. The author remarks that this is usually treated by irrigation, and that the membranes are not often removed mechanically. The reason given for this is that the operation is generally followed by metritis, but he makes a note that he doubts this excuse. The disease is generally treated by douches of acetate of lead or therapogen solution.

Parturient apoplexy is treated by Schmidt's method, insufflation of air, or both combined. It has been noticed that tuberculous animals, as a rule, do not get up.

In uterine or vaginal prolapse the classical methods of reduction are adopted, but in the latter it is the custom first to explore the ovary. Torsion of the uterus is treated in three ways: in the standing position *per vaginam*, a limb of the calf being used as a lever; by extra-abdominal pressure, or by rolling the patient.

The author noted various forms of mastitis (generally streptococcic) and stricture of the teat, but he saw nothing peculiar as regards treatment. He testifies to the value of Dr. Hess's book on disease of the foot of the ox, and mentions that in Switzerland great care is taken of the feet of working oxen.

(*Tierarztl. Ztrbl.*)

DISTURBANCE OF THE RESPIRATORY SYSTEM FOLLOWING ON THE INJECTION OF BARIUM CHLORIDE IN A CASE OF COLIC.

BY VOLLAND.

THE patient was attacked with severe colic, and amongst other things was given an intravenous injection of 25 cc. barium chloride at intervals of twenty minutes, till four doses had been administered. The urgent symptoms quickly subsided, and the horse remained stretched out with his eyes closed, but from time to time he assumed the sterno-costal position, and with the slightest excitement raised himself and became violently agitated.

In the calm intervals the following curious respiratory symptoms were observed. The movements were interrupted and at times almost ceased, so that the animal appeared to be dead. After twenty to twenty-five seconds there was a short inspiration that was very feeble indeed, almost imperceptible, followed by an expiration that lasted about five seconds. This was directly succeeded by a short but very deep inspiration that lasted about one second, and an expiration lasting five seconds: both expirations were accompanied by a short groan.

About six to eight respiratory movements were observed in twelve to fifteen seconds, the first strong, the following feeble or nearly imperceptible. There were about four interruptions in three minutes, which would give an average of about twelve movements per minute. The pulse was strong and regular.

The symptoms were observed for three or four hours, but only in the calm moments. They altogether disappeared when the spasms of pain came on, or when the horse raised himself.

The bowels were in due course emptied and the animal relieved, when the respiration became normal.

The author attributes these curious phenomena to the action of the barium chloride on the nerve centres.

(*Zeitschrift für Veterinärkunde.*)

SPONTANEOUS RUPTURE OF THE NON-GRAVID HORN OF THE UTERUS IN A COW IN ADVANCED GESTATION.

BY DR. E. WYSSMANN (NEUENEGG).

THE patient was a Simmenthal cow, aged 8. Two days after calving she altogether went off her feed and milk, and was continually groaning. The owner said that for three weeks previously she had fed and ruminated badly and had lost condition.

The eyes were dull, extremities cold, temperature 39° C., pulse small and quick, 112 beats per minute, respirations 40. The abdomen was painful on pressure over the false ribs; fæces hard and dark in colour. On exploration *per rectum* the uterus was felt to be œdematous and only slightly contracted. General peritonitis, probably due to a foreign body, was diagnosed, and the case being hopeless the animal was slaughtered.

About 50 litres of fœtid fluid were found in the abdomen, containing greyish-yellow fibrinous coagula. Adhering to the right horn of the uterus was a mass of tissue containing a number of minute vessels of a pink transparent colour. This mass represented a portion of the fœtal envelopes, and its free extremity was split up into two folds rolled up on each other.

The uterus was large, the serous membrane smaller and of a dark red colour, the walls being from 1½ to 2 cm. thick. The left horn, which contained the fœtus, was empty, the mucous membrane a dirty white, and the cotyledons a dark red. There was no trace of a wound. In the right non-gravid horn there was an elongated oval rent, with smooth cicatrised edges, through which a finger could only be passed with difficulty, situated midway between the two extremities. The rupture through the mucous coat was twice as long as that through the serous. A thin layer of yellowish scales covered the mucous membrane.

The supposition of perforation by a foreign body that passed from the stomach has to be considered. Friedberger and Fröhner mention some rare cases of such things penetrating to the uterus, and Imminger reports a case of colic in the gravid uterus. These cases are, however, exceedingly uncommon; but the cicatrix was that of a rupture, not a perforation.

Rupture of the uterus takes place under a variety of conditions, and as a rule is followed by displacement of the fœtus into the abdominal cavity. Calin, however, reports a case in which, although the uterus and vagina were ruptured for 50 cm., the fœtus was born.

In the first contractions the fœtus passes to the point of least resistance, that is, towards the os, but if by the contractions, or for any other reason, it takes a different course, the wall of the uterus, or even the horn, may be ruptured. If the fissure is narrow the fœtus remains in the uterus. In this case undoubtedly the rupture took place during the first attack of colic, *i.e.*, three weeks before calving, which explains the cicatrisation. The fœtal fluids escaped into the abdomen, and became fœtid from invasion by extraneous organisms. The author believes that a similar case has not yet been reported.

(*Schweizer Archiv. für Tierheilkunde.*)

Correspondence.

To the Editors of the VETERINARY JOURNAL.

DEAR SIRS,—I have met in Portugese Angola several cases, and here one case from that part, of a disease of horses and mules called "Humpata Sickness." The name is derived from a town of that name in Angola, which is situated about 100 miles from the west coast town Mossamedes, about 15° S. Lat.

Is this some South African horse disease under another name, or is it a distinct disease? Any information regarding the disease would be most gratefully received.

I am, Yours truly,

A. YALE MASSEY, M.B.

Tanganyika Concessions, Limited,
Kansanshi, N.W. Rhodesia.
December 1, 1906.

[We shall be pleased if some of our South African colleagues will give Dr. Massey the information he seeks, either through the columns of the Journal, or, to save time, to above address direct.—ED.]

Books and Periodicals, &c., Received.

Tropical Agriculturist; Veterinary News; Recueil de Médecine Vétérinaire; Farm and Home; Report of the Board of Agriculture; Department of Agriculture (Ireland).

Letters and Communications, &c.

Mr. T. A. Ford; Lieutenant Allen; Mr. Grasby; Mr. Dawes; Mr. Sutton; Mr. A. E. Payne.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements), should be addressed to the Editor.

Manuscript—preferably type-written—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

All authors desiring reprints of their articles will be supplied with copies free of charge upon requesting same within a week of publication of the JOURNAL.